Five-Year Review Report

Third Five-Year Review

For

Hagen Farm Superfund Site

Town of Dunkirk, Wisconsin

September 21, 2006

PREPARED BY:

Wisconsin DNR and
U.S. EPA Region 5

Approved by: **Date:**

for **Richard C. Karl, Director**
Superfund Division

9/21/06

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List of Acronyms

AOC	Administrative Order on Consent
ARAR	Applicable or Relevant and Appropriate Requirement
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DCE	1, 2-Dichloroethylene
ES	Enforcement Standard (state of Wisconsin)
ESD	Explanation of Significant Differences
EW	Extraction Well
GCOU	Groundwater Control Operable Unit
IC	Institutional Controls
ISVE	In-Situ Vapor Extraction
LFAS	Low Flow Air Sparge
LOD	Level of Detection
LOQ	Level of Quantification
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MW	Monitoring Well
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PAL	Preventive Action Limits (State of Wisconsin)
PPB	Parts-per-billion or micrograms per liter (ug/L)
PCOR	Preliminary Close Out Report
PRP or RP	Potentially Responsible Party
RA	Remedial Action
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SCOU	Source Control Operable Unit
TCE	Trichloroethylene

THF	**Tetrahydrofuran**
UAO	**Unilateral Administrative Order**
U.S. EPA	**United States Environmental Protection Agency**
VC	**Vinyl Chloride**
VOC	**Volatile Organic Compound**
WAC	**Wisconsin Administrative Code**
WDNR	**Wisconsin Department of Natural Resources**
WMWI	**Waste Management Wisconsin, Inc.**

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Executive Summary

The Wisconsin Department of Natural Resources (WDNR) is conducting this third five-year review of the remedy at the Hagen Farm Superfund Site, Dunkirk, Wisconsin with the assistance of the United States Environmental Protection Agency (U.S. EPA) under a cooperative agreement grant with Region 5. The triggering action for this statutory review is the completion of the last review on September 21, 2001. The five-year review is mandated by Section 121(c) of CERCLA, and amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA).

The Hagen Farm Site property is located one mile east of the City of Stoughton, Wisconsin and is approximately 28 acres in size. Within the property boundary is a disposal area of approximately 10 acres. The Site was operated as a sand and gravel pit prior to the late 1950s. The gravel pit was then used for the disposal of waste materials from the late1950s to the mid-1960s. Waste solvents and other various organic materials, in addition to the municipal wastes, were disposed of at the Site.

During the Remedial Investigation (RI), the major contaminants of concern were found to be tetrahydrofuran and vinyl chloride. Two operable units (OUs) were defined for the Site. OU I is the Source Control Operable Unit (SCOU) intended to address waste refuse and subwaste soils, and involved capping the Site and installing an active soil venting system. OU II is the Groundwater Control Operable Unit (GCOU) intended to address the contaminated on- and off-property groundwater at the Site. This OU included a groundwater pump and treat system which, as per the ROD, was anticipated to operate for about 30 years to achieve groundwater cleanup goals. In August 2000, a low flow air sparge system (LFAS) was proposed to replace the groundwater pump and treat system as a way to achieve cleanup goals more efficiently. U.S. EPA ultimately approved the use of air sparging and allowed for the temporary shutdown of the groundwater pump and treat system. Permanent replacement of the pump and treat system by air sparging was contingent upon demonstrating that groundwater contaminant levels meet the defined cleanup goals at the waste boundary.

The remedy at the Hagen Farm Superfund Site currently protects human health and the environment because the source of contamination is not accessible to humans. Under a source control operable unit, the onsite contamination has been consolidated and capped. Access and institutional controls, including fencing and deed restrictions, have also been implemented to prevent current and future exposures to onsite groundwater. Under the groundwater control operable unit, residences that rely on private groundwater wells, and are located downgradient of the source property, are sampled on an annual basis to ensure their groundwater is safe.

For the remedy to be protective in the long-term, however, the groundwater cleanup standards must be achieved and the institutional controls must be effective. In order to accomplish these goals, the low flow air sparging system should be reevaluated at the conclusion of the two-year probationary period, and the process outlined in the recent consent decree (CD) should be followed to ensure that an effective groundwater restoration system is in place. The agencies have made recommendations concerning the operation and data collection for the LFAS that will improve its effectiveness and allow for a more accurate evaluation of its performance.

Until groundwater cleanup standards are met, long-term protectiveness is also dependent upon effective institutional controls at the Site. U.S. EPA is assessing the institutional controls (ICs) at the Site and will develop an IC plan within six months to review the ICs, to determine whether any immediate changes are necessary, and to implement the changes in a timely manner.

The SOW appended to the recent CD states that the LFAS system must restore the groundwater within a reasonable time period. A reasonable time period is based on a number of site-specific factors as well as the remediation technologies employed. The GCOU ROD anticipated a period of 30 years to restore groundwater at the Site; however, it is difficult to predict the time that will be required to achieve groundwater cleanup goals under the LFAS system. The groundwater data evaluated so far does not show a significant overall trend in contaminant reduction throughout the aquifer beyond the waste boundary. This needs to be demonstrated if the remedy is to achieve groundwater cleanup goals in a reasonable time period; hence, the groundwater pump and treat system should remain onsite and operable, should its use be indicated. The PRP should investigate strategies for ensuring uninterrupted groundwater restoration should the LFAS system be found ineffective by the agencies.

The Site is inspected by WMWI's consultant, RMT, Inc. of Madison, Wisconsin on a monthly basis to conduct maintenance on the SCOU and GCOU treatment systems. As land development pressures in this area increase in the future, it becomes increasingly necessary to reevaluate the need for off-property controls, such as groundwater use restrictions. In conjunction with this five-year review, U.S. EPA is assessing the ICs at the Site. The PRP performed an IC study as requested by U.S. EPA. The U.S. EPA will develop an IC plan to include any corrective measures necessary after the IC study is reviewed. The effectiveness of the ICs should also be reevaluated during the next five-year review in 2011.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (*from WasteLAN*): Hagen Farm Superfund Site		
EPA ID (*from WasteLAN*): WID980610059		
Region: 5	**State:** WI	**City/County:** Town of Dunkirk/Dane
SITE STATUS		
NPL status: ☒ Final ☐ Deleted ☐ Other (specify)		
Remediation status (choose all that apply): ☐ Under Construction ☒ Operating ☐ Complete		
Multiple OUs?* ☒ YES ☐ NO	**Construction completion date:** 8/27/1996	
Has site been put into reuse? ☐ YES ☒ NO		
REVIEW STATUS		
Lead agency: ☒ EPA ☐ State ☐ Tribe ☐ Other Federal Agency		
Author names: Gary A. Edelstein, P.E.		
Author title: Remedial Engineer	**Author affiliation:** Wisconsin DNR, completed for U.S. EPA under a CA	
Review period:** 4 / 1 / 2006 to 9 / 21 / 2006		
Date(s) of site inspection: 5 / 11 / 2006		
Type of review: ☒ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion)		
Review number: ☐ 1 (first) ☐ 2 (second) ☒ 3 (third) ☐ Other (specify)		
Triggering action: ☐ Actual RA On-site Construction at OU #__ ☐ Actual RA Start at OU# NA ☐ Construction Completion ☒ Previous Five-Year Review Report ☐ Other (specify)		
Triggering action date (*from WasteLAN*): 9 / 21 / 2001		
Due date (*five years after triggering action date*): 9 / 21 / 2006		

* ["OU" refers to operable unit.]
** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, cont'd.

Issues:

This review has found that:

1. The expanded air sparging remedy should continue operating without the groundwater pump and treat system for another six months, until April 1, 2007. Six months will enable the expanded system to complete the agreed probationary operation period and to generate the necessary data for evaluating its effectiveness. However, increased pressures and airflows are needed in order for the LFAS to achieve greater effectiveness.

2. Monthly monitoring should continue in the same wells currently monitored on a monthly basis until late in 2007. The resulting data reports should include data on air pressure and airflow for each air sparge well. The next LFAS evaluation report submitted should include new redox cross-sections as well as a clear description of how each well data is classified as oxic or as sulfate-, iron-, manganese-, or nitrate-reducing.

3. The SOW appended to the recent CD states that the LFAS system must restore the groundwater within a reasonable time period. A reasonable time period is based on a number of site-specific factors as well as the remediation technologies employed. The GCOU ROD anticipated a period of 30 years to restore groundwater at the Site; however, it is difficult to predict the time that will be required to achieve groundwater cleanup goals under the LFAS system. Groundwater data evaluated so far do not show a significant overall trend in contaminant reduction throughout the aquifer, which will be necessary if the remedy is to achieve cleanup goals within a reasonable time period.

4. The PRP performs a selective ion monitoring (SIM) scan, which can achieve a LOD of 0.01 ppb for VC, for monthly samples at "offsite" wells. "Offsite" quarterly and semiannually VC samples will also receive a SIM scan. However, quarterly and semiannual "onsite" samples only receive a SIM scan if they come up no detect under the existing EPA method. The groundwater cleanup standard applies to all locations beyond the waste boundary; hence, a SIM scan should also be run for all wells, except those with consistently high VC levels.

5. In order for the remedy to be protective in the long-term, effective ICs must be implemented and maintained.

Recommendations and Follow-up Actions:

The following recommendations are made to improve the protectiveness of the remedy:

1. Regarding the LFAS system, the PRP should measure and increase air pressure in the AS wells in order to achieve greater airflows in the aquifer. The PRP should prepare and submit a final LFAS evaluation report to U.S. EPA and WDNR for review. The agencies must review the LFAS report and evaluate its effectiveness vis-à-vis the pump and treat system.

2. The groundwater pump and treat system should remain onsite and operable, should its use be indicated.

3. The agencies should meet with the PRP to discuss agency expectations for demonstrating LFAS effectiveness. The groundwater pump and treat system should remain onsite and operable, should its use be indicated. The PRP should investigate strategies for ensuring uninterrupted groundwater restoration should the LFAS system be found ineffective by the agencies.

4. To achieve SIM scan for all wells except those with anticipated or consistently high vinyl chloride.

5. An IC plan should be prepared within six months and should include: 1) evaluating the effectiveness and enforceability of the ICs and plan corrective actions, if necessary; 2) update IC maps to include the areas where groundwater exceeds cleanup standards overlaid with specific parcels; and, 3) amend the O&M plan to include regular inspections of the Site ICs, annual certification to U.S. EPA that ICs are in-place and effective, and a communications plan. Explore using the state's one-call system for ICs to ensure long-term stewardship of the Site

Protectiveness Statement(s):

The remedy at the Hagen Farm Superfund Site currently protects human health and the environment because the source of contamination is not accessible to humans. Under a source control operable unit, the onsite contamination has been consolidated and capped. Access and institutional controls, including fencing and deed restrictions, have also been implemented to prevent current and future exposures to onsite groundwater. Under the groundwater control operable unit, residences downgradient of the source property that rely on private groundwater wells are sampled on an annual basis to ensure their groundwater is safe.

For the remedy to be protective in the long-term, however, the groundwater cleanup standards must be achieved at the waste boundary. The agencies have made recommendations concerning the operation and data collection for the LFAS that will improve its effectiveness and allow for a more accurate evaluation of its performance. In order to accomplish this, the low flow air sparging system needs to be reevaluated at the conclusion of the two-year probationary period, and the process outlined in the recent CD needs to be followed to ensure that an effective groundwater restoration system is in place. Long-term protectiveness is also dependent upon effective institutional controls at the Site. U.S. EPA is evaluating the existing institutional controls to determine if they are effective and will develop an IC plan within six months to complete its review, determine whether any immediate changes are necessary, and implement the changes in a timely manner.

I. Introduction

The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

The Agency is preparing this Five-Year Review report pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The Agency interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The Wisconsin DNR conducted the five-year review of the remedy implemented at the Hagen Farm Superfund Site (the "Site") in the Town of Dunkirk, Wisconsin in conjunction with the United States Environmental Protection Agency (U.S. EPA), Region 5. This review was conducted for this Site from April 2006 through September 2006 by the Wisconsin Department of Natural Resources (WDNR) Project Manager with assistance from the U.S. EPA. This report documents the results of the review. As part of this review, the WDNR reviewed all data collected under the regular monitoring under operation and maintenance (O&M) for the Site to evaluate the current Site status.

This is the third such site-wide five-year review for the Hagen Farm Superfund Site. The triggering action for this statutory review is the previous (or second) five-year review completed on September 21, 2001. The triggering action for the second review was the first five-year review, which was completed on August 14, 1996. In accordance with Section 121 of CERCLA, the triggering action for the first statutory five-year review was the construction start date for the Source Control Operable Unit (OU1), which was August 14, 1991 as documented by U.S. EPA's WasteLAN database. This statutory five-year review was specifically activated by the presence

of hazardous substances, pollutants, and contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure.

II. Site Chronology

TABLE 1 – Chronology of Significant Site Events at the Hagen Farm Superfund Site

EVENT	DATE
Site Operated as Sand and Gravel Pit	Prior to Late 1950's
Waste Disposal occurs in the Gravel Pit	Late 1950s to mid-1960s
Property purchased by Orrin Hagen	November 1977
WDNR sampled private groundwater wells in response to complaints	November 1980 - 1986
WDNR brings enforcement against WMWI and Uniroyal for public nuisance. A civil suit is also filed by residents, and settled in 198	1983
Site Proposed on NPL	September 18, 1985
Site Listed on NPL and WDNR dismisses its enforcement action against Uniroyal and WMWI	July 22, 1987
AOC Signed by PRP to conduct the RI/FS	July 27, 1987
RI/FS Conducted for the entire Site	July 1988 - April 1992
ROD Signed for OU 1- Source Control Operable Unit (SCOU)	September 17, 1990
Institutional Controls (Deed Restrictions, Site Fence) Implemented	1991 - 1993
UAO to PRP for SCOU RD/RA work	March 1991
ESD Signed for SCOU to refine ISVE cleanup standard	April 1991
Remedial Design for SCOU Cap Completed	August 1991
RI/FS for GCOU Completed	April 1992
Construction Completion of SCOU Cap	May 1992
Final Inspection of SCOU Cap	July 28, 1992
ROD Signed for OU 2-Groundwater Control Operable Unit (GCOU)	September 30, 1992
UAO to PRP for GCOU RD/RA Work	November 25, 1992
RD for SCOU In-Situ Vapor Extraction (ISVE) System Completed	September 1993

EVENT	DATE
Construction of the SCOU ISVE Completed	January 1994
Final Inspection of SCOU ISVE	January 12, 1994
RD for GCOU Completed	May 19, 1995
Construction of the GCOU Completed	April 1996
Final Inspection of GCOU and Entire Site	April 17, 1996
First Five-Year Review Completed	August 14, 1996
ESD for GCOU Signed	August 27, 1996
Preliminary Closeout Report Signed	August 27, 1996
U.S. EPA Approval of Low-Flow Air Sparging System Implementation Plan	January 22, 2001
Second Five-Year Review Signed	September 21, 2001
Temporary shut-down of pump & treat system	September 4, 2001
Start of Shallow Air Sparging System Operation	January, 2001
Start of Expanded, Deeper Air Sparging System Operation	April, 2005
Five-year review Site inspection	May 11, 2006
Five Year Review Report Completed	September 21, 2006
Next (fourth) five-year review Report Due	September 21, 2011

III. Background

Physical Characteristics

The Hagen Farm Site is located at 2318 County Highway A in the Town of Dunkirk, approximately one mile east of the City of Stoughton, Dane County, Wisconsin (see Figure 1). The Site occupies the southwest quarter of Section 10, Township 5 North, Range 11 East, as shown in Figure 2. The Site is defined as the area within the Hagen Farm property boundary and the contaminant plume. The property is approximately 28 acres in size. Within the property boundary is a disposal area of approximately 10 acres. The Site is bounded on the south by Highway A and on the north by the northern face of the gravel pit and a private landing strip. The Yahara River is located about 1.5 miles to the west of the Site and flows in a southerly direction (Figure 2). Being in the Yahara River watershed, the topography is flat to gently rolling, with the land surface generally sloping toward the river from the higher areas northeast and east of the Site. Surface water drainage in the area is poorly developed due to permeable surficial soils. The only substantial surface water bodies are a pond located about one-half mile south of the Site and the Yahara River. The current Site topography is the result of sand and gravel mining and waste disposal activities, e.g., the excavated area in the northwest corner of the property is flat.

Land Resource and Use

Prior to disposal activities, the land comprising the waste disposal area was excavated for its sand and gravel. Thus, the natural habitat existing prior to extraction operations at the Site were destroyed. Presently, the waste disposal area is capped and supports vegetation such as grasses, herbaceous plants, and trees. The area is frequented by wildlife, notably birds, small mammals, and deer. Though an inventory of plants and animal species has not been performed, the Site is not known to be inhabited by rare or endangered species. Land in the vicinity has been developed for agricultural, mining, and commercial purposes. Sensitive ecological habitats are not in close proximity to the Site.

The Town of Dunkirk is an unincorporated township located about 10 miles southeast of Madison, Wisconsin in Dane County. Dunkirk is primarily a rural farming community of about 2,053 people as of the 2000 census. Of the 760 households, 595 families reside in the town. The Town of Dunkirk lost 3.2 percent of its population during the 1990s. Most of the land in Dunkirk is farmland and many of the residents are farmers. Dunkirk, together with the towns of Rutland, Dunn, and Pleasant Springs, has adopted the county's exclusive agricultural zoning ordinance which limits non-farm development in rural areas. As of the mid-1990's, over 40 percent of each town's farmland was enrolled in the State's Farmland Preservation Program, providing income tax credits to property owners who keep their land in agricultural use.(see Figure 3)

The City of Stoughton is about one mile east of Dunkirk, however according to its comprehensive plan, the City has adopted a 1.5-mile extraterritorial jurisdictional boundary (ETJ) which extends into the Town of Dunkirk and includes the Hagen Farm Site (See Figure 4). Within the ETJ, State statutes enable the City to plan and enact extraterritorial zoning, though much of the land within the City's ETJ remains outside the corporate limits (not annexed). The City of Stoughton has a population of about 12,600 people. Current land use surrounding the

Site includes a private 3,000-foot landing strip (Matson Airport) which is accessed from U.S. Highway 51. The strip ends directly at the northwest corner of the Site. To the east, the land is zoned for rural homes (RH-1 to RH-4) prescribing a residential density of one to 35 acres per residence. Directly west of the Site property, the land is zoned as agricultural (A-2). Highway A borders the southern edge of the property. The land south of Highway A, directly across from the property is used commercially (See Figure 5). The planned future use (see Figure 6) for the Site and immediate surrounding area is industrial. Planned neighborhood areas are to the northeast of the Site.

Potable water in this area is supplied from the Mt. Simon sandstone aquifer. The City of Stoughton urban service area, which includes the provision of public water supply and sanitary sewer systems, includes parts of the Town of Dunkirk. However, residents living in the vicinity of the Hagen Farm Site obtain their water from private wells. Under the terms of the UAO, WMTW must annually sample all private wells around and downgradient of the Site. Currently, 11 such wells are located on County Highway A and Collins Road. The Uniroyal Plastics Inc. (Uniroyal) plant in Stoughton is a major source of employment for Dunkirk residents and other residents of southern Dane County. Several other hazardous waste sites are located in southern Dane Co. such as the City Disposal Corp. and the Stoughton City Landfill Superfund sites.

The Site subsoils are dominated by interstratified sands, sand and gravel, and silty sands. Sandstone bedrock is at depths of 46 to 73 feet below ground surface. Groundwater occurs at depths ranging from 3 to 46 feet below ground surface in the vicinity of the Site, about 20 feet below ground in the disposal area. Groundwater flow beneath the main disposal area is to the southeast. Groundwater flow south of County Highway A appears to be generally south to southwesterly.

History of Contamination

The Site was operated as a sand and gravel pit prior to the late 1950s. Observations suggest gravel operations encompassed an area bounded by the current access road to the east, the former Schroeter property boundary to the west, and the current property boundary to the north (See Figure 2). Mining operations reportedly terminated approximately 14 to 18 feet below ground surface. Excavation may have ceased at this depth due to the presence of groundwater or a change in sand and gravel quality.

The gravel pit on the Site was then used for the disposal of waste materials from the late 1950s to the mid-1960s. During the period that the Site was operated as a disposal facility, the property was owned by Nora Sundby, since deceased. The property was then purchased from Nora Sundby by Orrin Hagen in November 1977. The Site is currently owned by Waste Management of Wisconsin, Incorporated (WMWI). The Site was operated by City Disposal Corporation, also the transporter of much of the waste that was deposited at the Site. City Disposal Corp. was subsequently purchased by WMWI. Uniroyal, located in nearby Stoughton, generated a portion of the industrial waste that was deposited at the Site between 1962 and August 1966.

Waste solvents and other various organic materials, in addition to the municipal wastes, were disposed of at the Site, including acetone, butyl acetate, 1-2-dichloroethylene (1,2-DCE), tetrahydrofuran (THF), solid vinyl, sludge material containing methyl ethyl ketone and xylenes, and toluene. In a 103(c) Notification submitted to U.S. EPA by Uniroyal, in June 1981, Uniroyal

indicated that F003 and F005 wastes (spent non-halogenated solvents), which are hazardous wastes according to the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. 6901, also were disposed of at the Site. This Site stopped accepting waste in 1966, prior to regulation of hazardous waste disposal by RCRA Subtitle C.

Initial Response

Beginning in November 1980, in response to complaints received from local residents, the Wisconsin Department of Natural Resources (WDNR) began sampling groundwater at nearby private water supply wells. Sampling of the onsite monitoring wells during the period 1980-1986 indicated certain organic compounds were present in the groundwater, including benzene, ethylbenzene, THF, xylenes, and toluene.

In addition, nearby private water supplies on adjacent properties also contained detectable levels of volatile organic compounds (VOCs). The private wells located on adjacent properties had been impacted by acetone, THF, vinyl chloride, xylenes, trans-1,2-DCE, and trichloroethylene (TCE).

The Site was previously owned and operated by City Disposal Corporation, which WMWI acquired. Therefore, WMWI, as corporate successor to City Disposal, owned and operated the City Disposal landfill during its operating life. In 1983, the State of Wisconsin brought an enforcement action for abatement of a public nuisance against WMWI and Uniroyal. At the same time, residents nearby the Site brought a civil action against WMWI and Uniroyal, seeking civil damages for reduced property values and potential health hazards resulting from groundwater and well contamination. The State of Wisconsin obtained a dismissal of its 1983 enforcement action against WMWI and Uniroyal after the Site was listed on the National Priorities List (NPL). In 1986, the parties to civil litigation brought by the nearby residents to the Site against WMWI and Uniroyal reached a settlement. The exact terms of the settlement are confidential. It is known, however, that one of the terms of the settlement required WMWI to purchase the Site property from Orrin Hagen, as well as other property located adjacent to the Site. Upon acquiring these properties, WMWI razed the onsite structures. WMWI is the current owner of the Hagen Farm Site.

The Site was proposed for inclusion on the NPL on September 18, 1985 and listed on the NPL on July 22, 1987. Two potentially responsible parties (PRPs), Uniroyal and WMWI, named by U.S. EPA in connection with the Site, conducted a Remedial Investigation and Feasibility Study (RI/FS) for the Site from 1988 to 1992. This work was conducted under an Administrative Order on Consent (AOC) with U.S. EPA that was signed by the PRPs on July 27, 1987.

A. Basis for Taking Action

During the RI, two operable units (OUs) were defined for the Site. The OU approach was agreed upon after discussions among U.S. EPA, WDNR, and the PRPs during the early phase of the implementation of the Work Plan for the RI. OU I, which is the Source Control Operable Unit (SCOU), was intended to address waste refuse and subwaste soils. OU 2, which is the Groundwater Control Operable Unit (GCOU), was intended to address the contaminated on- and off-property groundwater at the Site. For purposes of this report, "on-property groundwater" is defined as contaminated groundwater on and in the immediate vicinity of the main waste disposal area and "off-property groundwater" is defined as contaminated groundwater at any

location within the plume downgradient of the property boundary.

A.1 Operable Unit I - SCOU

The RI/FS for the SCOU was finalized in July 1990. In general, the RI included the following conclusions:

1. Three disposal areas were present, with most of the waste was in one main disposal area which was given the designation "waste disposal area A" or "area A";

2. Hazardous substances were not detected in the two smaller disposal areas;

3. Area A is approximately six acres in size, an average of eight feet thick, and contains an estimated 67,650 cubic yards of waste;

4. Waste found in area A includes municipal waste, paint sludge, grease, rubber, plastic sheeting, and several industrial chemicals;

5. The major contaminants found in the waste and groundwater around the waste were THF, xylenes, toluene, benzene, ethylbenzene, acetone, 2-butanone, semi-volatiles, barium, lead, and mercury;

6. The waste is in contact with groundwater;

7. Wastes are a continuing source for groundwater contamination; and

8. Contaminants in the waste and groundwater around the waste pose an unacceptable risk to human health, primarily from direct contact, inhalation, and ingestion of onsite groundwater under current- and future-use scenarios.

A.2 Operable Unit II - GCOU

The RI/FS for the GCOU was finalized in April 1992. The RI for the GCOU presented the nature and extent of contamination in the groundwater and evaluated possible exposure pathways. In general, the report included the following conclusions and observations concerning contamination at the Site:

1. The contaminants causing the most concern in groundwater are VOCs. The most prevalent VOC in groundwater was THF with a maximum detected concentration of 630,000 parts per billion (ppb) (the current State cleanup standard is 10 ppb);

2. The occurrence, concentration, and distribution of THF suggested that there is a THF plume originating from the disposal area and extending about 3,600 feet downgradient (south);

3. VOCs were not detected in samples collected from private wells during the investigation;

4. The results of a treatability study indicated that THF and other VOCs in groundwater can

be effectively treated using activated biological sludge; and

5. Groundwater posed an unacceptable risk to human health, primarily from the potential ingestion of contaminated groundwater near the Site under current- and future-use scenarios.

IV. Remedial Actions

B. Remedy Selection

B.1 Operable Unit I – SCOU

The technology screening and alternative development were conducted in the 1989 Alternatives Array Document. The Feasibility Study (FS) was finalized in July 1990 and a Proposed Plan announcing the selected remedy was issued for public comment. The U.S. EPA, with State concurrence, issued a Record of Decision (ROD) for the SCOU on September 17, 1990. The remedial action objectives (RAOs) included:

1. To reduce or minimize direct contact with the contaminated waste and soils; and

2. To reduce or minimize release of contaminants to the groundwater.

The ROD for the SCOU addressed the contamination source including waste refuse and subwaste soils. The remedy selected to meet these objectives included:

- Consolidate three waste disposal areas (areas A, B, and C) into area A;

- Cap the consolidated wastes;

- Install and operate an In-Situ Vapor Extraction (ISVE) system through the cap;

- Evaluate the promotion of natural microbial degradation activities of VOCs in the waste and subwaste soils during implementation of the ISVE system; and

- Prevent installation of drinking water wells within the vicinity of the disposal areas and protection of the cap through use of deed and access restrictions.

The consolidation and capping portion of the remedial action (RA) for the SCOU addressed the source of contamination and reduced the potential human health risks by eliminating the direct contact and inhalation exposure routes. In addition, the capping and ISVE portion of the selected RA for the SCOU reduced contaminant loading to the groundwater, and provided the first step to eliminating potential human health risks associated with the groundwater ingestion scenario.

An Explanation of Significant Difference (ESD) was issued in April 1991. The ESD was initiated after the ROD was signed because information became available to U.S. EPA and WDNR which allowed U.S. EPA to further refine the ISVE cleanup standard. The ROD goal for the ISVE was 90 percent removal of VOCs in the waste and subwaste soils. U.S. EPA, with State concurrence, made the decision to use a groundwater/soil-gas model (model) for each VOC

detected during the RI in the waste and sub-waste soils and/or the groundwater to determine the cleanup standard for the waste and subwaste soils. In addition, the ISVE was to operate for at least two years prior to running the model. This would insure that data used for the model represented ISVE steady state conditions and reflected ISVE parameters over time. Using the model to determine the cleanup standard ensured cleanup levels that were measurable, reliable, and consistent with the NCP.

B.2 Operable Unit II - GCOU

U.S. EPA, with State concurrence, issued a ROD for the GCOU on September 30, 1992. The RAOs of the ROD for the GCOU were to address the contaminated on- and off-property groundwater at the Site and included:

1. Restore groundwater so that contamination levels meet appropriate federal and state groundwater quality standards;

2. Stop the flow of contaminated groundwater downgradient of the Site and to the Yahara River; and

3. Prevent the flow of contaminated groundwater to residential wells.

The remedy selected to meet these objectives included:

- Extract and treat of on- and off-property groundwater;

- Treat extracted on-property groundwater using activated biological sludge (ABS) and treat extracted off-property groundwater using a technology to be determined by bench scale tests during the remedial design (RD) phase;

- Discharge treated groundwater to neighboring wetlands or the Yahara River located 1.5 miles west of the Site;

- Treat and dispose of sludges generated from the groundwater treatment, and treat off-gases emitted from the treatment process;

- Use bench-scale studies to determine the effect of nutrients and/or oxygen on contaminated groundwater with the goal of enhancing bioremediation in the aquifer;

- Monitor all private wells located around the Site; and

- Use deed and access restrictions to prevent the installation of drinking water wells within the vicinity of the disposal area and off-property. Specifically, the selected remedy stated:

> "Institutional controls would include on-property land use and on- and off-property groundwater use restrictions in the form of existing deed restrictions to the extent necessary to implement and protect the remedy, and to safeguard human health and the environment during implementation of the remedy. The

cooperation of local agencies would be required to limit future off-property use of groundwater if the Respondents [PRP] are unable to obtain deed restrictions from affected property owners. A fence shall be installed around the treatment facility system in order to prevent public access."

Treatment technologies tested on a bench-scale level for the off-property groundwater contamination included cascade aeration, biological treatment, air stripping, granular activated carbon (GAC), and ultraviolet (UV)-chemical oxidation. These tests indicated that biological treatment was the most effective treatment technology for contaminated off-property groundwater at this Site.

As per the ROD, the selected remedy of groundwater extraction and treatment was anticipated to require as much as 30 years to restore the aquifer. The ROD also stated that the time required to achieve the RAOs was limited by the extraction technology. Remediation times are described in terms of advection flushing times. The effects of retardation and dispersion are not accounted for in the groundwater remediation time estimates. Advection flushing time is between 10 and 15 years under the selected remedy. The addition of in-situ bioremediation may decrease the remediation time to between 5 and 10 years, however actual cleanup time will likely be substantially longer due to the effects of retardation and dispersion.

An ESD for the GCOU was signed on August 27, 1996 because information became available to U.S. EPA and WDNR during, and shortly after, the design phase of the project which made modifications to the ROD necessary and/or cost effective. The ESD documented and justified three modifications to the selected remedy, as presented in the 1992 ROD. The modifications included:

1. Discharging treated groundwater back into the ground (reinfiltration), onsite, and upgradient of the capped waste disposal area, instead of to the Yahara River or wetlands;

2. Combining extracted on- and off-property groundwater into one influent stream and treating the single influent stream in an on-property treatment facility, as opposed to treating on- and off-property groundwater at two separate facilities; and

3. Using fixed film biological treatment (FFBT), instead of ABS, to treat all extracted groundwater.

Concerning modification number three, FFBT is essentially the same as ABS, but uses specific material, such as plastic balls, to allow the biological component (bacteria) of the treatment process to stick to and be "fixed" in-place. Tests conducted during the design showed that this method provided for better operation and contaminant removal efficiency than ABS.

C. Remedy Implementation

The remedial design and remedial action (RD/RA) for both operable units was conducted by one PRP, WMWI. WMWI settled claims against Uniroyal in December 1992. WMWI is currently the only participating PRP.

In general, the remedial activities were conducted as planned. Significant modifications are documented in the two ESDs discussed in Section B of this report.

A final construction inspection of the entire Site was conducted on April 17, 1996 and included representatives from the U.S. EPA, WDNR, and WMWI. At that time, it was determined that the cap, ISVE and groundwater pump and treat system were constructed as designed and were functioning properly. A Preliminary Close Out Report (PCOR) for the entire Site was completed by U.S. EPA on August 27, 1996.

C.1 Operable Unit I - SCOU

The RD/RA activities for the SCOU were completed by the PRP, WMWI, under the enforcement authority of a Unilateral Administrative Order (UAO). The UAO for the SCOU was issued to the PRP in March 1991.

Under the oversight of the U.S. EPA and WDNR, the PRP, completed the RD for waste consolidation and capping in August 1991. Onsite construction began in September 1991. In general, the remedial activities were conducted as planned. Two smaller areas (areas B and C) were exhumed, consolidated into the main disposal area (area A), and area A was capped. Areas B and C were backfilled with clean fill material. Approximately 30,000 cubic yards of refuse and non-native materials were removed from the smaller areas and added to area A. After consolidation, area A contained 97,650 cubic yards of waste to be capped, however, the overall acreage footprint of area A did not change. The cap is a solid waste design in compliance with Ch. NR 504.07, WAC and includes a clay cap with a geotextile filter. The cap layers consist of (from bottom to top) 24 inches of clay, 12 inches of drainage gravel, a non-woven geotextile fabric to provide filtration and to keep the gravel clean, 18 inches of rooting zone soil, and six inches of vegetative topsoil.

Construction of the cap was completed in May 1992. A final inspection of the cap was conducted on July 28, 1992 and included representatives from the U.S. EPA, WDNR, and the PRP. At that time, it was determined that the construction was implemented as designed. A final construction completion report (Final Remedial Action Implementation Report) for the waste consolidation and capping was submitted to U.S. EPA and WDNR in June 1992.

The PRP, under U.S. EPA and WDNR oversight, completed the RD for the ISVE system in August 1993, following pilot-scale testing to determine the RD parameters. Onsite construction of the ISVE began in September 1993 and generally conformed to the planned RA activities. The ISVE system consists of eight vapor extraction wells, which are screened from the bottom of the waste, through the sub-waste soils, and down to groundwater. Twenty-nine gas probes, screened at various depths designed to monitor extraction well effects, were installed at various locations and depths throughout and around the landfill. The ISVE discharges VOCs directly to the atmosphere, untreated, in compliance with the substantive requirements of a Wisconsin air-use permit (Ch. NR 445, WAC).

Construction and start up of the ISVE system was completed by January 1994. The system continues to operate. A final inspection of the ISVE was conducted on January 12, 1994 and included representatives from U.S. EPA, WDNR, and the PRP. At that time, it was determined that the ISVE system was constructed as designed. A final construction completion report was

submitted to U.S. EPA and WDNR in February 1994.

The Feasibility Study (FS), which evaluated the natural microbial degradation of VOCs in the waste and subwaste soils, was submitted by WMWI to the U.S. EPA and WDNR in September 1994. In general, the FS concluded that construction of an enhanced biological treatment system for the SCOU at the Site would not be feasible or cost-effective for the following reasons:

1. The system would provide limited biological enhancement, given the relatively small size of the landfill;

2. The existing ISVE system alone is capable of enhancing the needed biological activity without nutrient additions; and

3. The system would require excavating and removing significant sections of the cap. Construction activities in the cap would create a high potential for compromising the cap's integrity.

The U.S. EPA and WDNR agreed with this conclusion and did not pursue an enhanced natural biological treatment system.

As per the April 1991 ESD, the ISVE cleanup standard was further refined from the ROD goal of 90 percent removal of VOCs in the waste and subwaste soils. A groundwater/soil-gas model provided VOC cleanup standards for each VOC detected during the RI in the waste and subwaste soils and/or the groundwater in order to better refine the cleanup standard for the waste and subwaste soils. The model was submitted by the PRP to the U.S. EPA and WDNR in August 1996, and demonstrated that the system is operating according to design. From the model, the predicted soil and corresponding soil-gas cleanup levels for THF are 0.1 ug/kg and 0.007ug/l, respectively. The predicted soil and corresponding soil-gas cleanup levels for total xylenes are 2.6 ug/kg and 23.5 ug/l, respectively.

C.2 Operable Unit II – GCOU Pump and Treat

The RD/RA activities for the GCOU were completed by the PRP under the enforcement authority of an UAO, issued by U.S. EPA in November 1992. Under U.S. EPA and WDNR oversight, the PRP completed the RD for the groundwater pump and treat system in May 1995. Onsite construction began in November 1995. The hiatus in time between the design completion and onsite construction was due to contract difficulties between the PRP and its contractor and back-orders for specialized pieces of equipment related to the treatment process such as a site-specific sludge filter press.

In general, the remedial activities were conducted as planned. It should be noted that under the Scope of Work for the RA work plan, the groundwater restoration system, including the low flow air sparge system (LFAS) discussed below, was to be operated until groundwater cleanup standards were achieved in the aquifer at the point of compliance, i.e., the waste boundary, and downgradient. The cleanup standards for groundwater at this Site are the Preventive Action Limits (PALs), as set forth in Wisconsin Administrative Code (WAC), Chapter NR 140.

Table 2 shows the applicable PALs and Enforcement Standards (ES) for chemicals found at the Site.

TABLE 2 – Hagen Farm Groundwater Cleanup Standards and Maximum Concentrations Detected for the Chemicals of Concern Identified

Chemicals	Maximum Concentrations Detected since 2001 (ug/L or ppb)		Cleanup Standards (ug/L)					
	Onsite Conc. (well) date	Offsite Conc. (well) date	ES		PAL		MCL	
			ROD	2004	ROD	2004	ROD	2004
Organic								
Benzene	7.0 (OBS-1C) 5/05	1.0 (OB-11M) 8/03	5	5	0.067	0.5	5	5
1,1- DCE	ND	ND	7	7	0.024	0.7	7	7
cis-1,2-DCE	4.0 (P-7B) 8/04	2.0 (OBS-2C) 8/05	100	70	10	7	N.L.	70
trans-1,2-DCE	ND	ND	100	100	20	20	N.L.	100
Ethylbenzene	570 (P-17C) 8/04	0.6 (P-35B) 8/02, 8/05	1,360	700	272	140	700	700
Tetrahydrofuran	26,000 (P-7B) 2/02	12 (OB-11M) 8/01	50	50	10	10	NA	NA
Toluene	50 (P-7B) 8/02, 8/05	2.0 (P-35B, OB-8M) 8/02, 11/03, 8/05	343	1,000	68.6	200	1,000	1,000
Xylenes	1,400 (OBS-1C) 8/05	0.9 (OB-8M) 11/03	620	10,000	124	1,000	10,000	10,000
Vinyl Chloride	23 (P-17C) 2/01	4.0 (OB-11M, P-28B) 2/02, 5/02, 8/02, 11/02, 2/03	0.2	0.2	0.0015	0.02	2	2
Inorganic								
Arsenic	129 (P-22B) 8/05	29.1 (P-27B) 8/01	50	10	5	1	50	10
Barium	260 (IG-04) 8/05	144 (P-27B) 8/02, 8/05	1,000	2,000	200	400	2,000	2,000
Iron	4.3 (P-26B) 8/01	4,500 (P-27B) 8/02, 8/05	300	300	150	150	300[1]	300[1]
Lead	14,200 (OBS-1B) 5/01	2.3 (P-29C) 8/05	50	15	5	1.5	15[2]	15[2]
Manganese	2,670 (MW-22) 8/05	358 (P-28B) 5/02, 8/05	50	50	25	25	50[1]	50[1]
Mercury	0.28 (IG-04) 8/01	ND	2	2	0.2	0.2	2	2

ES – Enforcement Standard, NR 140, WAC
PAL – Preventive Action Limit, NR 140, WAC
MCL – Maximum Contaminant Level, Safe Drinking Water Act
NL – Not listed in the ROD document
NA – Not Available as MCLs have not yet been promulgated for this chemical

[1] Secondary MCL based on aesthetic qualities of drinking water
[2] Action Level value

Significant modifications to the GCOU were documented in an ESD (discussed in Section B.2 of this report and below). The groundwater extraction system consists of four extraction wells within the contaminant plume: three on-property near the landfill (EW-1, 2, and EW-3) and one off-property about 800 hundred feet south of the landfill (EW-5). The system as a whole was designed to pump between 80 and 130 gallons per minute (gpm). The treatment plant was constructed on the property, along the southern edge of the landfill (see Figure 7). The treatment system was designed to treat high flow rates (70-100 gpm) of moderately to highly contaminated water, e.g., greater than 2,000 ug of THF per liter of groundwater. The treatment plant treated extracted groundwater for VOCs and metals prior to discharge back into the ground, in compliance with the substantive requirements of a Wisconsin Pollutant Discharge Elimination System (WPDES) permit. VOCs were treated using submerged fixed-film biological treatment. This process destroyed VOCs, making air treatment technologies to capture off-gases unnecessary. The WPDES discharge permit levels were the State of Wisconsin groundwater Enforcement Standards (ES) presented in Table 2. Discharge of treated water into the ground occurred through an infiltration gallery (IG) located just upgradient of the landfill.

As documented in the ESD for the GCOU, the treated groundwater was discharged onsite to an infiltration gallery (IG) instead of the Yahara River. Bioremediation bench-scale studies and computer modeling for the infiltration gallery indicated that the gallery may help expedite the cleanup by flushing contaminants through the ground into the pumping wells, enhancing bioremediation through the introduction of oxygen-rich effluent water into the aquifer. Based on the bench-scale studies, U.S. EPA did not anticipate the need for additional nutrient loadings to the aquifer to enhance bioremediation activities beyond what was supplied by the infiltration gallery. Figure 7 depicts IG areas 1, 2, 3, and 4 in the northeast corner of the fenced area.

Construction of the groundwater pump and treat system was completed in April 1996. A final inspection of the system was conducted on April 17, 1996 and included representatives from the U.S. EPA, WDNR, and WMWI. At that time, it was determined that the groundwater pump and treat system was constructed in accordance with the design, and was functioning properly. The system was anticipated to operate for as long as 30 years in order to achieve groundwater cleanup goals. A final construction completion report with as-built drawings for the groundwater pump and treat system was submitted to U.S. EPA and WDNR in January 1999. However, the system has been temporarily shut down since September 4, 2001 in order to pilot test a low-flow air sparge (LFAS) system (discussed below) as an exclusive technology to achieve the final clean-up goals.

C.3 Operable Unit II – GCOU Low-Flow Air Sparging

In August 2000, WMWI submitted a proposal to pilot test a LFAS system at the Site. Theoretically, the LFAS would enhance the natural attenuation process at the Site by adding air to the groundwater to raise the dissolved oxygen (DO) level. The DO is consumed by competing chemical reactions occurring in the substrate. The major constituent of concern, THF, has been shown to undergo microbial degradation in an aerobic environment. The bacteria degrading THF derive their energy and perform most efficiently in oxygen and nitrogen-rich environments. The other major contaminant of concern, vinyl chloride, has been shown to degrade either aerobically or anaerobically. The PRP proposed that the use of LFAS, as a way of attaining cleanup goals for the limited amount of remaining groundwater contamination, could potentially replace the groundwater pump and treat system permanently.

U.S. EPA agreed with the concepts in the proposal and allowed the PRP to install the LFAS system in fall 2000, prior to U.S. EPA approval of a complete plan and before system startup and operation. U.S. EPA approved the Low-Flow Air Sparge System Implementation and Monitoring Plan on January 22, 2001 and the system became operational later that month. By reviewing and approving a complete plan concurrent with construction of the system, time was saved and U.S. EPA was able to approve an as-built version of the system along with the concepts and monitoring proposals to support the action. On August 21, 2001, the PRP submitted a proposal to temporarily shut down the groundwater pump and treat system in order to pilot test the full-scale operation of the LFAS system. U.S. EPA approved the proposal on August 23, 2001 and the groundwater pump and treat system was temporarily shut down on September 4, 2001. The air sparge system continues to operate.

The addition of air to groundwater at the Site was to raise the DO level in the aquifer and promote natural degradation, as opposed to physically stripping the compounds from the liquid vapor phase. As a result, much lower flow rates, i.e., 5 to 10 cfm, are seen at the Site than typical flow rates for air sparging. Six air sparge wells were installed to a depth of approximately 50 feet, and are configured in a line about 60 feet apart and just downgradient of the landfill (the anaerobic zone). As mentioned, the system initially operated concurrently with the pump and treat system for approximately eight months. Once the air sparge monitoring data indicated that DO levels were increasing, the groundwater pump and treat system was temporarily shut down as a pilot test to determine how effective the air sparge system was by itself at restoring the groundwater to cleanup goals at the Site. Figure 7 depicts the air sparge wells.

The September 2001 Five Year Review Report stated:

> "The length of time to determine if the air sparge system is working will likely be established within one to two years after temporary shutdown of the groundwater pump and treat system. Based on the results of the pilot test, and if U.S. EPA is fully confident that the air sparge system is working according to design, the groundwater pump and treat system may not be needed and the air sparge system may completely replace the groundwater pump and treat system for treating groundwater contamination. This remedy modification may be documented in an ESD at that time. However, the pump and treat system will remain operational until cleanup goals are met in the event that it is needed to control contaminants and/or achieve final groundwater cleanup goals. If the air sparge system works according to the Low-Flow Air Sparge System Implementation and Monitoring Plan, it is estimated that it will take approximately 5-10 years to achieve cleanup goals with the low-flow air sparge system alone."

U.S. EPA undertook a comprehensive review of the data at the Site in 2004 utilizing its own contractor, Subterranean Research, Inc. This review, summarized in a June 15, 2004 letter from U.S. EPA to WMWI, stated that:

- The system has had little effect on dissolved oxygen concentrations in the aquifer.

- Vinyl chloride continues to exceed standards across a large area and there is a lack of trends towards improvement in VC concentrations.

- The effectiveness of the air sparge system on all the remaining contaminants of concern, primarily THF, is questionable.

- Benzene and THF increases at well P-17C were of concern.

The letter asked WMWI to develop a plan to address levels of THF, and to a lesser extent, benzene at well P-17C; to investigate the air sparge system and make corrections to ensure desired dissolved oxygen levels are being met; and, to evaluate alternative treatment options for THF in lieu of air sparging.

This letter triggered a series of communications between U.S. EPA and WMWI between late 2004 and early 2005. WMWI proposed several actions, including restarting the pumping of groundwater from extraction well 1, but discharging directly to the seepage system without treatment. U.S. EPA responded that treatment to State standards (PALs) would be necessary.

As part of these communications, a letter to WMWI dated March 1, 2005 outlined, U.S. EPA's expectations and requirements for the Site, which included attaining groundwater cleanup goals within a reasonable period of time. It stated that U.S. EPA may require restarting the pump and treat system or performing source removal if the planned enhancements and actions taken by WMWI were not able to achieve the goal of attaining groundwater standards in a reasonable period of time. It also stated that sampling from new well OBS-2C would be examined, and that if the results were above standards, then pumping from extraction well 1 must be resumed.

Ultimately, WMWI implemented the following actions:

- Four additional deeper air sparging wells were installed perpendicular to the plume and downgradient from the source area generally in the area of the shallow sparging wells. These wells began operating in April 2005.

- Additional groundwater monitoring wells were installed.

- More intensive groundwater monitoring, including monthly monitoring over a limited period of time for certain wells.

After reviewing the results of the work, including monitoring results, U.S. EPA responded in a letter to WMWI on November 15, 2005, stating:

- While drops in THF levels in well P-17C were encouraging, the levels are still well above cleanup standards and those levels found in the well between 1999 and 2002.

- The decision on the requirement to pump from EW-1 is postponed until monthly monitoring results through March 2006 can be evaluated for all wells.

- Lab methods for VC should be evaluated to use a method with a lower method detection limit that is closer to the groundwater cleanup standard.

WMWI submitted an evaluation of the sparging system, accounting for monitoring results through March 2006. The U.S. EPA and WDNR evaluation of those results is presented in Section D.2.

Groundwater remediation will continue until analyses consistently indicate that the groundwater cleanup objectives have been met. As mentioned, groundwater cleanup objectives are the attainment of the Preventative Action Limits (NR 140 WAC) for contaminants and a cumulative excess lifetime cancer risk not exceeding one-in-one-million ($1x10^{-6}$).

C. 4 Access and Institutional Controls

Both the 1990 SCOU ROD and the 1992 GCOU ROD required that institutional controls (ICs) be implemented at the Site. ICs are non-engineered instruments, such as administrative and legal controls that help to minimize the potential to exposure to contamination and that protect the integrity of the remedy. ICs are required to assure long-term protectiveness for any areas which do not allow for unlimited use or unrestricted exposure (UU/UE). ICs are also required to maintain the integrity of the remedy.

The ICs were included as part of the remedy in order to prevent the installation of drinking water wells in the vicinity of the disposal area, to protect the cap, to protect the treatment facility and, to the extent necessary, to implement and protect the remedy and safeguard human health and the environment during implementation of the remedy. These controls included securing the Site by placing a fence around the cap and treatment facility and obtaining deed restrictions to prevent the installation of drinking water wells (see Figure 8). As part of the SCOU, a site security fence was installed in 1991 around the entire on-property area to protect the cap and treatment facility, and to prevent public access. On-property deed restrictions to prevent the use of groundwater were recorded in 1991 and 1992. As stated in the selected remedy for OU 2, off-property ICs would be used to the extent necessary to implement and protect the remedy and to safeguard human health and the environment during implementation of the remedy.

Another level of protection is afforded by the current WDNR requirement Ch. NR 112.08, which prohibits the installation of a water supply well in a known contaminated aquifer or within 1,200 feet of a landfill without prior approval from WDNR. As long at this requirement remains in place, it will provide some measure of protection, provided it is adhered to by well owners and/or well drillers. The effectiveness of these requirements will be considered in U.S. EPA's IC Plan following this five-year review.

Currently, no other ICs are in place with respect to offsite groundwater; none of the identified offsite private water supply wells have shown contamination in excess of the drinking water standards. As previously mentioned, the offsite private wells are annually monitored for site-related contaminants. Should such contamination become evident, U.S. EPA will evaluate the need for additional ICs to address the contamination, in conjunction with any other indicated corrective measures. New development to the west of the Site near the City of Stoughton was noted during the May 2006 five-year review site inspection. All developments within the City's boundaries are presently served by the Stoughton municipal water system.

In May 2006, U.S. EPA formally requested that WMWI perform an IC control study for use in the present five-year review report. WMWI provided the requested study (see Appendix1) to U.S. EPA in June 2006 during which a title commitment was performed. The study confirms that deed restrictions have been placed on portions of all three of the property parcels owned by WMWI at the Hagen Farm Site. The entire contiguous restricted area is a smaller area than the

WMWI property and lies within the property boundary. The restricted area is fenced and the restrictions run with the land. No new wells have been installed except for a replacement well on the Sundby property. A new house was built approximately one-quarter mile to the east of the Site, but it is not known if a water well permit was requested. WMWI also sold a portion of the property on the west side of the Site to a developer, however the sales agreement required that municipal services be provided to that area if/when development occurs.

Although the institutional controls in place appear to be adequate at this time, U.S. EPA is currently evaluating them further. U.S. EPA will develop an IC Plan that will include any corrective measures found to be necessary after its review of the IC study. The Site is inspected by WMWI's consultant, RMT, Inc. of Madison, Wisconsin on a monthly basis to conduct maintenance on the SCOU and GCOU treatment systems and to inspect the Site security. Because groundwater exceeds performance standards, groundwater use restrictions to the south of the Site must be evaluated. U.S. EPA will complete an IC Plan within six months to determine if additional ICs are needed. Additionally, it is recommended that IC needs be evaluated during the next five-year review in 2011.

D. System Operations/Operation and Maintenance (O&M)

The date of commencement of the O&M period for the SCOU is indicated as February 22, 1994 in the U.S. EPA database. As mentioned, a site wide PCOR was completed on August 27, 1996; thereby triggering the start of O&M for the GCOU (groundwater pump and treat system). The PRP contractor for this work was Montgomery Watson Harza Americas, Inc. In April 2005, WMWI notified U.S. EPA that it planned to change its O&M contractor to RMT, Inc. of Madison, WI.

Pursuant to CERCLA Section 121(c), a statutory five-year review was completed for the Site on September 21, 2001, five years after the last five-year review. The 2001 five-year review concluded that both the SCOU and GCOU remedies were constructed and functioning as designed, and the overall remedy was protective of human health and the environment. The 2001 five-year review recommended the continued operation of the ISVE and air sparge system, or a combination of the air sparge and pump and treat system, until groundwater clean-up goals (PALs) are achieved.

The following table presents an estimate of three years of system operations and maintenance (O&M) costs since the last five-year review (September 21, 2001 to present). The costs shown are rounded to the nearest dollar and provide a relative comparison between the three years. Because the costs do not include oversight costs accrued by U.S. EPA and WDNR, which are billed to WMWI, they are an underestimate of actual costs.

TABLE 3 – Estimated Relative Operation and Maintenance Costs for the Hagen Farm Site

Year	Gen. Plant Operation & Inspection	Blower O&M	Commu-nication	Landfill Gas Monitoring	Electric Costs	GW Monitoring Wells	Sampling, Analysis & Reporting	Total Costs
2001[1]	$88,515	$5,049	$749	$9,225	$19,176	$39,597	$9,227	$171,538
2002	$34,242	$6,559	$667	$8,925	$11,330	$41,002	$8,456	$111,181
2003[2]	$37,986	$2,644	$689	$4,590	$9,153	$38,493	$8,276	$101,831

1 - Groundwater extraction system shut off in September 2001

2 - Includes the months of January-November 2003 only

D.1 Operable Unit I - SCOU

A long-term O&M plan for the cap was included as part of the completed RD for the cap, which was approved by U.S. EPA in August 1991. An RA construction completion report, which included as-built drawings, was submitted by WMWI to U.S. EPA and WDNR in June 1992. The long-term monitoring includes yearly inspections of the cap, mowing the grass, and maintaining the fence (see Attachment 1). Since the cap was installed, yearly inspections to date have indicated that the integrity of the cap appears to be sound and that it is functioning as designed. Grass mowing is performed annually, and the fence is being maintained and is in good condition.

A long-term monitoring and O&M plan for the ISVE system was included in the August 1993 completed RD for the ISVE, and in the ISVE Remedial Action Implementation Report of February 1994. The ISVE Remedial Action Implementation Report also includes as-built drawings. In January 1994, the startup and operation of the ISVE system began in accordance with the approved RD plan. Since that time, the system has operated nearly uninterrupted, except for intermittent short-term shutdowns for maintenance, adjustments, evaluations of natural microbial VOC degradation, and malfunctions. Based on the most current progress report (April 2006) from WMWI, the ISVE flow rates have ranged from 262 to 289 cfm.

Monitoring points for the ISVE system include the gas probes, gas wells, and the blower station. Monitoring at the gas probes includes measuring gas pressure, photoionization detector (PID) response, and gas composition (oxygen, carbon dioxide, and methane). Monitoring at gas wells includes gas flow, temperature, well pressure, header pressure, PID response, gas composition, colorimetric tube analysis (annually for xylenes, toluene, methyl ethyl ketone, and gasoline), and gas sampling and analysis for VOCs at the operating wells. Blower monitoring includes gas flow, temperature, header pressure, air dilution valve setting, PID response, gas composition, colorimetric tube analysis, and gas sampling and analysis for VOCs.

The most current progress report indicates that the ISVE system continues to create a vacuum and provide aerobic conditions within the landfill. VOC emissions are below regulatory limits or thresholds.

D.2 Operable Unit II - GCOU

An O&M plan for the groundwater pump and treat system was submitted by WMWI as part of the May 1995 completed RD. A construction completion report with as-built drawings was submitted by the PRP to U.S. EPA and WDNR in January 1999. A long-term groundwater-monitoring plan was submitted by the PRP as part of the July 1993 RD Work Plan. The groundwater-monitoring plan was modified in April 2000 to include a reduction in the frequency of monitoring from quarterly to annually for off-property wells, and from quarterly to semi-annually for on-property wells. In January 2001, the monitoring plan was again modified to reflect increased groundwater monitoring frequency back to quarterly for two years following startup of the low-flow air sparge system. This recent modification was included as part of the January 2001 Low-Flow Air Sparge System Implementation and Monitoring Plan. An O&M plan for the low-flow air sparge system, including as-built drawings, was submitted by WMWI as part of the January 2001 Low-Flow Air Sparge System Implementation and Monitoring Plan.

The groundwater pump and treat system startup activities were conducted according to the approved RD Plan. The system began operating in April 1996. Since that time, the system has operated on a consistent basis with intermittent shutdowns for system maintenance, adjustments, and malfunctions. The system was temporarily shutdown for an air sparge system pilot test on September 4, 2001 (discussed below).

A depiction of the isoconcentrations which define the plume for a major contaminant of concern, THF, is shown in Figure 9. The figure shows the plume movement from August 2001 through February 2004—the time period during which the groundwater extraction and treatment system was phased out and the air sparging system began operating under the pilot testing. In October 2004, WMWI submitted an air sparging system performance study which concluded that the air sparge system was effective for in-situ treatment of THF and VC within its zone of influence, but recommended expanding the zone of influence to address the VOCs in the bedrock system. After receiving agency comments on the study, WMWI submitted an air sparge system performance and work plan in January 2005 which proposed an expansion to the system, i.e., that four deeper air sparge wells (AS-07 through AS-10) be interspersed along the currently existing line of six shallower air sparge wells (AS-01 through AS-06) located between the waste boundary and treatment building.

An O&M plan for the April 2005 air sparge system expansion was submitted by WMWI as part of the 2005 work. The work plan for the expanded system anticipated that the system would need to operate for two years before it could be credibly evaluated. However, the work plan contained no criteria for determining the number of performance evaluations that would occur during this interim testing period in which the pump and treat system was not operating. No criteria were presented to the agencies for determining the effectiveness of the LFAS system, or at what point contingencies would need to be implemented.

U.S. EPA approved the work plan but did not devise any LFAS performance criteria, in consultation with WDNR, by which it could objectively determine whether the expanded LFAS system was effectively restoring the groundwater, and/or under what conditions the pump and treat system would need to be restarted. However, it should be noted that U.S. EPA was in the process of negotiating a consent decree (CD) with WMWI containing provisions for evaluating and/or discontinuing the use of the LFAS system, as detailed in Section V of this report. The

present air sparge system and groundwater monitoring wells at the Site are presented in Figure 7.

The sparging system operating pressures (measured in pounds-per-square-inch or psi) and airflow (measured in cubic-feet-per-minute or cfm) are compiled and reviewed from the monthly field monitoring data collected to evaluate O&M for the system. Operating pressures are typically in the 30 to 45 psi range for the deeper sparging wells. These operating pressures result in airflows of 5 to 6 cfm, which are at the lower end of the operating range. WMWI indicated that due to the depth of these deeper air-sparging wells, the operating pressures measured may not have been sufficient to displace the water in the wells so that air could be introduced to the groundwater. Modifications were made to the system to increase the air pressure and airflow in the deeper sparging wells in November 2005. Air pressures were increased to about 60 psi resulting in airflows in the 10 to 25 cfm range. Following this modification, THF concentrations in well OBS-1C (which monitors the effects of deeper sparging wells on groundwater) began to show a decline.

U.S. EPA and WDNR have reviewed the groundwater monitoring results through March 2006 presented in the March 31, 2006 report prepared for WMI entitled: "Updated Interim Evaluation of Groundwater Monitoring Data, Expanded Air Sparging System". Data plots for wells OBS-1C, OBS-2C, and P-17C for certain organic contaminants are included as Attachment 2. The groundwater monitoring results tables for VOC contaminants and DO from the report are included as Attachment 3. For the wells expected to show increased DO and reduced contaminant concentrations due to the expanded air sparging system, the results show:

- With the exception of well OBS-1B, where an improvement has been shown, the system has had little effect on DO concentrations in the aquifer, including wells far downgradient of the sparging system. More data are needed to determine if there is an improvement in well OBS-1C.

- The THF concentrations in wells OBS-1A, OBS-1B, and OBS-2C have recently decreased to levels below the method detection limit for THF. Well P-17B appears to be showing a declining trend in THF concentrations to below the cleanup standard or PAL of 10 ppb, but more data are needed to confirm this. Well P-17C also appears to be showing a declining trend. Though THF concentrations remain well above the PAL and well above the levels found in the well between 1999 and 2002, Attachment 2 shows that THF will achieve cleanup goals by early 2008 in this well. Finally, well OBS-1C shows very high concentrations of THF well above the PAL; however these levels are decreasing very gradually (Attachment 2). While THF concentrations in OBS-1C are of the same order of magnitude as when it was first sampled, they are lower than what was shown when the well was first sampled. Concentrations increased between January and March 2006. The attached data plot for OBS-1C shows the recent results for THF. The trend line indicates that THF cleanup goals in this well may be achieved by about 2015.

- Vinyl chloride concentrations have improved at a number of locations, including OBS-1B, P-17B, P-27B, P-28B, and P-32B. These wells show levels near the current (as of January 2006) method detection limit of 0.24 ppb, except for P-17B, which has more recently shown concentrations in the 0.5 to 1.0 ppb range. It should be noted that the method detection limit used historically at this Site (0.6 ppb) is considerably above the vinyl chloride ROD cleanup standard (0.0015 ppb) and the current PAL of 0.02 ppb. Well OBS-2C has improved but is still showing concentrations exceeding the PAL.

Wells OBS-1C and P-17C are still showing VC concentrations well above the cleanup standard; however P-17C shows a gradual downward trend. The attached data plots for OBS-1C, OBS-2C, and P-17C show the recent results for VC.

- Benzene concentrations in wells OBS-1C and P-17C are well above the ROD cleanup standard (0.067 ppb) and the current PAL of 0.5 ppb and indicate no particular increasing or decreasing trends. The attached data plots for OBS-1C and P-17C show the recent results for benzene.

- Xylenes in wells OBS-1C and P-17C are well above the ROD cleanup standard of 124 ppb. Well OBS-1C shows no significant trend toward decreasing concentrations. Well P-17C showed an improvement in 2002 for xylenes then had significant increasing concentrations from 2002 until late 2005 and is now possibly showing somewhat of a trend towards decreasing concentrations. The attached data plots for OBS-1C and P-17C show the recent results for xylenes.

In summary, several key wells have not shown a discernible downward concentration trends for important contaminants and there are increasing concentrations in at least one well, as described above. Further, no real increase in DO levels have been demonstrated throughout the aquifer. Some wells have shown lower concentrations of THF and VC since the deeper sparging system was installed; however, there has been no corresponding rise in DO levels that would indicate that biodegradation of contaminants is increasing. This suggests that decreased contaminant concentrations might instead be attributable to seasonal changes in groundwater flow, dilution of contaminants, or air stripping. There is no strong evidence to unequivocally state that aerobic degradation of THF and VC are occurring at the Site.

Data were also examined from other wells closer to the contaminant source area and wells farther from the source area that were not expected to be affected by the sparging system. Many of these wells are not showing trends towards increasing levels of DO. Well P-22C has shown a recent increase in THF concentrations.

The evaluation of groundwater data shows that there has been not been a significant overall trend towards improvement in groundwater quality throughout the aquifer beyond the waste boundary as one would expect if the Site was moving towards achieving the groundwater cleanup standards in a reasonable period of time.

Monthly monitoring of certain wells ended in March 2006 after the results were submitted. As noted above, some wells need further monitoring to determine trends. Also, it is likely that the current system will continue operating for the next several months while the U.S. EPA and WMWI discuss the recommendations of this report. In the mean time, monthly groundwater monitoring of those wells currently being monitored on a monthly basis should continue. This monthly data will allow for the continued detailed evaluation of the air sparging system and will provide ongoing detailed information during the parties' discussions. Attachment 4 provides a summary of the groundwater-monitoring schedule. The following table summarizes the activities concerning the GCOU:

TABLE 4 – Low Flow Air Sparging System Activities

ACTIVITY	DATE
Startup of shallow air sparging system	January 1, 2001
Shutdown of pump and treat system	September 1, 2001
Down time of shallow air sparging system	June 10, 2004 – July 3, 2004
Start up of expanded air sparging system	April 1, 2005
Interim evaluation of expanded air sparging system submitted to U.S. EPA and WDNR	October 15, 2005
Increased pressure and airflow of deeper sparging system	November 7, 2005
Updated interim evaluation of expanded air sparging system submitted to U.S. EPA and WDNR	March 30, 2006
Projected conclusion of two-year evaluation of LFAS	April 1, 2007

U.S. EPA and WDNR have always expressed a concern that the laboratory used by WMWI, STL, uses a detection level well above the PAL of 0.02 ppb for vinyl chloride. The Wisconsin regulation NR 140.16(2)(c) requires use of a detection level and quantification level below the PAL. WMWI has indicated that its contract laboratory for groundwater analyses, STL Buffalo, utilizes the WDNR-approved EPA method 8260B which provides a level of detection (LOD) and level of quantification (LOQ) of 0.24 ppb and 0.8 ppb respectively.

WMWI has agreed to run a selective ion monitoring (SIM) scan, which can achieve a LOD of 0.01 ppb for VC for monthly sampling at wells they characterized as being 'offsite'. "Offsite" VC samples collected for the quarterly and semi-annual monitoring will also receive a SIM scan. However, quarterly and semiannual "onsite" samples will only receive a SIM scan if they come up non-detect under the existing analytical method. Given that the groundwater cleanup standard applies to all locations—at the waste boundary and beyond, there should be no distinction made between "onsite" and "offsite" wells with regard to meeting the cleanup standards. Accordingly, the SIM method should be run for all wells except those consistently showing high levels of VC, such as OBS-1C and P-17C.

V. Progress since the Last Five-Year Review

The 2001 five-year review recommended:

A. Continued operation of the ISVE system at the SCOU until soil cleanup standards are achieved.

B. Continued operation of the ISVE system at the SCOU to help reduce contaminant loadings to groundwater by removing contaminants from the source, thereby accelerating the achievement of groundwater cleanup standards for groundwater contaminants of concern at the Site.

C. Continued active remediation of the groundwater through the low-flow air sparge system, groundwater pump and treat system, or a combination of the of both until it has been demonstrated to U.S. EPA that groundwater cleanup standards have been achieved and a petition to cease operation of the system is approved by U.S. EPA.

Since 2001, the agencies found that the original shallow air sparge system was not effectively remediating the groundwater because it did not provide a large enough aerobic zone to deal with the entire plume. As discussed in the previous section, the LFAS system was subsequently expanded in 2005 by adding four additional deeper wells. Groundwater monitoring through March 2006 has shown that the expanded system does appear to be achieving an oxic environment (increased DO levels), but only in the immediate vicinity of the sparging wells. While some wells have shown reduced contaminant concentrations, several critical monitoring wells have not. Some wells have shown increased contaminant concentrations.

In July 2006, a consent decree (CD) was signed between WMWI and U.S. EPA, and is presently being lodged with the Department of Justice (DOJ). The purpose of the CD is to reimburse the PRP in response costs. Pursuant to a bankruptcy settlement agreement and stipulated order in 1993 involving various Uniroyal-related entities, the United States received shares of Uniroyal Technology Corp. stock. The bankruptcy settlement agreement and stipulated order required U.S. EPA to credit the proceeds of the sale of that stock to various sites for which the Uniroyal entities were liable, including the Hagen Farm Site, thereby reducing the liability of other PRPs for those Sites. U.S. EPA has determined the dollar amount that is available to reduce the liability of the current PRP (WMWI) at the Hagen Farm Site as required by the settlement agreement and stipulated order.

Pursuant to the terms of the CD, WMWI will also: 1) reimburse costs incurred by U.S. EPA and the DOJ; and, 2) perform studies and remedial response work at the Hagen Farm Site. A Scope of Work (SOW) for the Remedial Action Work Plan is attached as Appendix M to the CD. The SOW details the requirements for the continued implementation of the two RODs, which U.S. EPA issued on September 17, 1990, and September 30, 1992 and the ESDs which the U.S. EPA issued in April 1991 and on August 27, 1996. In designing, implementing, and submitting deliverables for the ongoing RA work at the Site, the PRP is required to adhere to the SOW, the RD/RA guidance and work plans, RODs, ESDs, all U.S. EPA-approved O&M plans, all additional approved plans, any additional guidance provided by U.S. EPA.

The SOW states that if, at any time, U.S. EPA and/or WDNR determine that the LFAS cannot remove remaining groundwater contamination at an acceptable rate, then the PRP must evaluate and implement appropriate measures to ensure the remedy continues to be protective of human health and the environment. Within 60 days of written notification from U.S. EPA, the PRP must submit a written report outlining the results of its evaluation and propose measures for addressing the groundwater contamination in a reasonable period of time. The report must include an evaluation of corrective measures options (including but not limited to: re-starting the existing pump and treat system, expanded pump and treat, source control or removal actions, and in-situ groundwater treatment methods), a schedule for completing proposed corrective measures, and a description of the monitoring program (if revised from the current plan).

If U.S. EPA rejects or comments on the report, then the PRP must submit a revised report within 30 days after receiving comments from U.S. EPA. Upon approval of the revised report by U.S. EPA, the PRP must implement the recommendations in the approved report in accordance with

the schedule included in the report or established by U.S. EPA. If U.S. EPA determines that a ROD amendment or ESD is necessary to document the decision to conduct additional or revised remedial actions, then the final approval will be issued after the ROD amendment or ESD is completed.

If, after implementation of the approved report recommendations and agency conditions, U.S. EPA, in consultation with WDNR, determines that the additional actions are not sufficient to address remaining groundwater contamination at an acceptable rate, then the PRP must repeat the process in the previous paragraph to remediate the groundwater.

When the PRP believes that the LFAS, or any other groundwater system operating at the Site, has consistently met all groundwater cleanup standards at least over six consecutive sampling rounds, the PRP can submit a petition to cease operating the system. U.S. EPA may deny the petition if it determines that there is inadequate monitoring data or information to support the petition.

If U.S. EPA determines that the petition contains insufficient data to warrant shutting down the LFAS or other groundwater restoration system, then U.S. EPA may inform the PRP of the additional sampling and monitoring necessary to determine whether shutdown is appropriate. If the PRP wishes to submit a new petition to cease operations, it must submit a revised groundwater sampling and monitoring plan for implementing the required additional sampling and monitoring within the time period required by U.S. EPA. This revised plan must be submitted at least six months before sampling and monitoring under the revised plan would begin.

VI. Five-Year Review Process

Administrative Components

This Site five-year review was conducted by Gary Edelstein of WDNR, with assistance from Sheila Sullivan of U.S. EPA. Remedial Project Manager (RPM) for the Hagen Farm Site. The review components include:

- Community Involvement
- Document Review
- Data Review
- Site Inspection
- Local Interviews
- Five-Year Review Report Development and Review

Community Involvement

A notice, announcing that a five-year review was to be conducted at the Hagen Farm Site, was published on March 23, 2006 in the local newspaper, the Stoughton Courier-Hub (Attachment 5).

A notice will be published in the same local newspaper at the conclusion of this Five Year Review. The notice will announce the completion of the five-year review report and that the

results of the review and the report are available to the public at the Stoughton Public Library and the U.S. EPA Region 5 and WDNR offices.

Document Review

This five-year review consisted of a review of relevant documents including O&M records. The report "Updated Interim Evaluation of Groundwater Monitoring Data, Expanded Air Sparging System, March 30, 2006 and the 2005 Annual Operation and Maintenance Report of April 27, 2006 were the most recent PRP submittals reviewed. In addition, correspondence between U.S. EPA and WMWI was reviewed, including more recent correspondence relating to the groundwater remediation efforts. See Attachment 6 for the list of documents reviewed for this report.

Site Inspection

The Five Year Review Site inspection was conducted by Mr. Gary Edelstein of the WDNR on May 11, 2006. Attachment 7 provides a copy of the handwritten inspection form. The purpose of the inspection was to assess the protectiveness of the remedy, including the condition of the fencing to restrict access and to protect the integrity of the cap.
No significant issues were identified at any time regarding the drainage structures, or the fence. Examination of the cap revealed that the grass cover was in good condition. The cap and the surrounding areas were undisturbed. There is a riprap layer that acts as a toe drain for the gravel drainage layer situated above the clay cover. There is a geotextile layer above the drainage layer that appears to be installed between the gravel and the riprap. The PRP inspection forms were examined (see Attachment 1) and found to be adequate for the Site features. Attachment 8 provides photographs taken during the five-year review site inspection, together with a list of photos and photo key diagram.

As mentioned under Section III "Land and Resource Use", new development near the City of Stoughton, to the west of the Site was noted during the five-year review site inspection. All developments within the City boundaries are served by the Stoughton municipal water system.

Interviews

Mr. John Roelke of RMT, Inc., the O&M Site Manager, was interviewed at the Site inspection. Mr. Michael Peterson, Project Manager for the Closed Sites Management Group of WMWI, was also interviewed and conducted the Site tour. The purpose of the interviews was to complete the five-year review site inspection form, which is provided as Attachment 7.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

The review of documents and the results of the five-year review Site inspection indicate that the OU1 or the SCOU portion of the remedy is functioning as intended by the ROD and ESDs that support it. The SCOU addressed the source of contamination and was to reduce the potential for human health risks by eliminating direct contact with the waste, as well as inhalation and

exposure routes. The consolidation and capping of the wastes, in combination with the institutional controls—access restrictions (fencing) and deed restrictions preventing use of the groundwater and onsite development—effectively block the exposure routes of concern and reduce overall human health risk from the Site. Further, the ISVE system has reduced contaminant loading from the source to the groundwater. This review found that operation and maintenance of the cap and drainage structures has, on the whole, been effective. The Site fence adequately secures Site access. A study of the institutional controls used at the Site to prevent the use of onsite groundwater as drinking water was performed by WMWI. U.S. EPA is currently reviewing this study and will develop an IC plan to include any corrective measures necessary after the review is completed. This portion of the remedy contributes to the short-term protectiveness of the remedy. However, the ICs need to be thoroughly assessed in order to determine whether offsite ICs are required to ensure longer-term protectiveness. To assure long-term stewardship of the Site, future O&M work should include mechanisms to ensure the regular inspection of ICs at the Site, and an annual certification to U.S. EPA that ICs are in place and effective.

The assessment of OU2 or the GCOU portion of the remedy according to *Question A* is more complicated because the remedy currently being used to address the groundwater contamination is not the remedy that was described in the ROD for the GCOU, i.e., groundwater extraction and treatment. For the past five years, a low flow air sparging system has been substituted on an interim or trial basis for the pump and treat system. While the groundwater extraction system had been operating according to the decision documents, the processing of extracted groundwater via fixed-film biological treatment and upgradient reinfiltration to the aquifer was not efficient[1]. The present LFAS system is an effort to treat groundwater contaminants in situ. Most of the remaining groundwater contamination is in the anaerobic zone immediately downgradient of the SCOU. The LFAS system was installed to aerate this zone and provide more efficient remediation than that provided by the groundwater pump and treat system.

At the time the agencies approved the expanded air sparge system (April 1, 2005) WMWI projected that two years of operation were necessary to demonstrate its effectiveness as a replacement to the pump and treat system. Since the data suggest that air sparging has helped reduce concentrations of THF and VC in the immediate vicinity of the air sparge wells, it appears that adjusting the system may improve its performance. Thus, the agencies believe that the expanded air sparging remedy, with further adjustments, can continue to be evaluated without turning on the groundwater pump and treat system for another six months, until April 1, 2007. Six months will enable the expanded system to complete its probationary operation period and generate the necessary data to evaluate its effectiveness.

Two measures to consider when evaluating the effectiveness of the LFAS system include: 1) the magnitude of reduction of the contaminants at the property boundary and offsite; and, 2) the length of time required to achieve the cleanup standards. While related, the measures do not necessarily parallel each other due to the complexity of the aquifer system and the multitude of

[1] Data showed that the contaminant mass removal rate at the treatment plant was relatively low compared to removal through natural biodegradation in the aerobic zones of the aquifer. Based on the average influent concentrations and flow-rates observed from May 1999- 2000, an estimated THF mass removal rate of 0.22 pounds per day (lbs/day) was expected during the next year utilizing the current groundwater treatment system. In contrast, the THF mass removal rate in the aerobic zones of the aquifer was estimated to be 7.2 lbs/day. As contaminant concentrations continue to decrease, the THF mass removal rate at the treatment plant decreased even further.

reactions and parameters involved in the treatment and attenuation processes at the Site. While the expanded system appears to be creating an oxic environment with concomitant reduction in some contaminants, this is only evident in the immediate vicinity of the air sparging wells. The time period required so far to achieve the present contaminant levels is 10 years (from the date of the PCOR, August 27, 1996). Five of these years have been under the operation of the LFAS system. While the SOW appended to the recent CD states that the LFAS system must restore the groundwater within a reasonable time period, such a time period is based on a number of site-specific factors as well as the remediation technologies employed.

As mentioned, the pump and treat system was anticipated to achieve cleanup goals within 30 years of operating, however it is difficult to predict the time required to achieve VC cleanup goals in groundwater under the LFAS system. The groundwater data evaluated so far does not show a significant overall trend in contaminant reduction throughout the aquifer beyond the waste boundary. This needs to be demonstrated if the remedy is to achieve groundwater cleanup goals in a reasonable time period; hence, the groundwater pump and treat system should remain onsite and operable, should its use be indicated. The PRP should investigate strategies for ensuring uninterrupted groundwater restoration should the LFAS system be found ineffective by the agencies.

With respect to the LFAS system operation, the agencies agree with the need for the increased pressures (and concomitant higher airflows) achieved by the adjustments to the system in November 2005. This evaluation should be allowed to continue under the following conditions: 1) the monitoring should continue and should include well-specific tabulated data on air pressure and air flow as these data will enhance future evaluations; and, 2) the next evaluation report submitted should include new redox cross-sections as well as a clear description of how each well data is classified as oxic or as sulfate-, iron-, manganese-, or nitrate-reducing.

The agencies do not find any significant changes in the redox condition classifications based on the monitoring well chemistry data. The conceptual cross-sections provided in the evaluation reports (October 14, 2005 and March 31, 2006) both represent oxic conditions near and above the screens of AS wells, but there are no water sample data supporting this hypothesis. Natural attenuation (a term that includes dispersion, diffusion, off-gassing, advection, dilution, sorption, and chemical reaction processes, as well as biodegradation) appears to be operating offsite. Data from OBS-2C indicate that it is nearly clean; they also suggest that OBS-2C is not intersecting the downgradient extent of the zone of contamination identified by OBS-1C and P-17C.

The slight changes in groundwater flow caused by the AS system are not nearly as impactful as operation of the extraction wells would be. Extraction wells would create a capture zone, and its southeasterly extent would allow recovery of some contaminated water. However, the downgradient extent is estimated to be on the order of hundreds of feet; contamination beyond that would continue to naturally attenuate. Water pumped from the capture zone would be treated and reinfiltrated upgradient, hence, disposal of the treated water would have the effect of reducing the down-gradient extent of capture the extraction wells might produce. At this time, the PRP proposal to not turn on EW-1 while continuing air sparging using the higher air pressures and flows of recent months appears reasonable for the next six months until the end of the LFAS probationary period. At that time, U.S. EPA in consultation with WDNR will evaluate the effectiveness of the system and proceed according to the terms of the CD described under Section V.

The zone of groundwater flow convergence southeast of the AS wells correlates with the high THF concentration wells OBS-1C and P-17C, as well as the location of EW-1. This is suggestive of a narrow preferential pathway in the uppermost fractured rock that would explain the historical migration of THF. This information might provide for the potential for preferential remediation, if properly manipulated.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy. There are no changes in land use or anticipated land use on or near the Site that change the effectiveness of the remedy.

Changes in Standards and To Be Considereds

Since the 1990 and 1992 RODs for the Site, there have been changes to the groundwater cleanup standards (PALs) and ESs for some of the contaminants of concern (see Table 2). These changes do not affect the remedial action objectives of the remedy. There have been no other changes in ARARs, standards and TBCs of note.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment. These assumptions are considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels. No change to these assumptions or the cleanup levels developed from them is warranted. There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No ecological targets were identified during the baseline risk assessment and none were identified during the five-year review, and therefore monitoring of ecological targets is not necessary. No weather-related events have affected the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

Technical Assessment Summary

According to the data reviewed, the site inspection, and the interviews, the remedy appears to be functioning as intended by the ROD and ESDs. Some progress towards meeting the groundwater cleanup standards has been shown in some wells utilizing the actions implemented, including the air sparging system. However, several critical wells are not showing improvement, which is necessary if the remedy is to achieve groundwater cleanup goals in a reasonable time period. There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy. While the PALS and ESs have changed for some of the contaminants of concern since the two RODs were implemented, these do not affect the remedy's remedial action objectives. There has been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment, and there have been no

change to the standardized risk assessment methodology that could affect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

Implementation of ICs and Other Measures

As mentioned in Section C.4, both the SCOU ROD and the GCOU ROD required the implementation of ICs at the Site. ICs are non-engineered instruments, such as administrative and legal controls that help minimize potential exposure to contamination and that protect the integrity of the remedy. ICs are required to assure long-term protectiveness for any areas which do not allow for unlimited use or unrestricted exposure (UU/UE). The ICs were included as part of the remedy in order to prevent the installation of drinking water wells in the vicinity of the disposal area, to protect the cap, to protect the treatment facility and, to the extent necessary, to implement and protect the remedy and safeguard human health and the environment during implementation of the remedy. These controls included securing the Site by placing a fence around the cap and treatment facility and obtaining deed and access restrictions to prevent the installation of drinking water wells.

The following table summarizes the areas where Access and ICs were required by the remedy and the rationale therein. When viewing the table, refer to Figure 8 for the respective map:

TABLE 5 – Access and Institutional Controls Assessment

Areas that do not allow for UU/UE	IC Objective/ Access Restriction/ Performance Standard	Access and ICs in Place
Area of Site with WDNR NR 504 solid waste landfill cap.	prohibit interference with the cap/ maintenance required	A Site security fence was installed in 1991 around the entire on-property area to protect the cap and treatment facility, and to prevent public access.
Area of the Site where soil has been remediated to commercial/industrial cleanup levels (see Figure 8 and Appendix 1 for legal description).	Prohibit residential or commercial use of the onsite property.	On-property deed and access restrictions were recorded in 1991 and 1992 that specifically prohibit any residential or commercial use, including but not limited to filling, grading, excavating, building, drilling, mining, farming, or other development, or placing waste material, except with the approval of U.S. EPA, in consultation with the state, as consistent with the requirements of the UAO.
Area of Site where groundwater plume exceeds groundwater cleanup goals or PALs	Prohibit any consumptive or other use of the ground-water that could cause exposure to humans or animals until PALs have been achieved at the waste boundary (onsite). thus guaranteeing the safety of groundwater migrating offsite.	On-property deed and access restrictions to prevent the use of groundwater and the installation of public wells were recorded in 1991 and 1992; off-property ICs will be used to the extent necessary to implement and protect the remedy and to safeguard human health and the environment during implementation of the remedy, the RA, and O&M. WDNR requirement NR 112.08 prohibits the installation of a water supply well in a known contaminated aquifer or within 1,200 feet of a landfill without prior approval from WDNR.
Site remedial components: - Consolidate and cap waste; - Install and operate an ISVE system in source area (through the cap); - Extract, combine, and treat on- and off-property groundwater via FFBT; - Discharge treated groundwater to reinfiltration area onsite and upgradient of cap; - Use LFAS to enhance bioremediation in the aquifer; - Monitor all private wells located around the Site annually.	Prohibit any use of, or activity, that may interference with the work to be performed and long-term operation and maintenance of all remedial components including the cap, ISVE system, LFAS, groundwater extraction and treatment, and groundwater monitoring.	As stated above, a Site security fence was installed around the entire on-property remediation area to protect the cap and treatment facility, and to prevent public access. On-property deed and access restrictions were recorded in 1991 and 1992 that specifically prohibit any residential or commercial use, including but not limited to filling, grading, excavating, building, drilling, mining, farming, or other development. These controls have been applied to all lands owned by WMWI in proximity to the Hagen Farm Site, and shall run with the land as provided by law and shall be binding on all parties and all persons claiming under WMWI.

The May 2006 IC study and title commitment performed by WMWI confirms that deed restrictions were placed on portions of all three of the property parcels owned by WMWI at the Hagen Farm Site. The entire contiguous restricted area is smaller than the WMWI property and lies within the property boundary. The restricted area is fenced and the restrictions run with the land. No new wells have been installed except for a replacement well on the Sundby property.

A new house was built approximately one-quarter mile to the east of the Site, but it is not known if a water well permit was requested. WMWI also sold a portion of the property on the west side of the Site to a developer, however the sales agreement required that municipal services be provided to that area if/when development occurs.

The institutional controls in place appear to be adequate at this time. The Site is inspected by WMWI's consultant, RMT, Inc. of Madison, Wisconsin on a monthly basis to conduct maintenance on the SCOU and GCOU treatment systems and to inspect the Site security. New development to the west of the Site near the City of Stoughton was noted during the May 2006 five-year review site inspection. All developments within the City's boundaries are presently served by the Stoughton municipal water system. As land development pressures in this area increase in the future, it will be necessary to reevaluate the need for off-property controls, such as groundwater use restrictions south of County Highway A. IC needs should be evaluated during the next five-year review in 2011.

The recent CD being lodged by the DOJ contains language and provisions for applying and enforcing future additional ICs at the Hagen Farm Site. If U.S. EPA determines that any property where access and/or land/water use restrictions in the form of state or local laws, regulations, ordinances or other governmental controls are needed to implement the remedy selected in the ROD and the CD, ensure the integrity and protectiveness of, or ensure noninterference, WMWI must cooperate with U.S. EPA's efforts to secure these controls. A series of IC maps is being developed that depict areas subject to use restrictions. These maps will be made available to the public on U.S. EPA's Superfund Data Management System (SDMS) and will serve as an informational IC. These maps when made available to the public can be considered an informational IC.

VIII. Issues

Table 6 presents the issues identified at the Hagen Farm Site as a result of this five-year review.

TABLE 6 – Issues

ISSUES	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
U.S. EPA and WDNR believe the expanded air sparging remedy should continue operating without the groundwater pump and treat system for another six months, until April 1, 2007. Six months will enable the expanded system to complete the agreed probationary operation period and to generate the necessary data for evaluating its effectiveness. However, increased pressures and airflows are needed in order for the LFAS to achieve greater effectiveness.	N	Y
Monthly monitoring should continue in the same wells currently monitored on a monthly basis until late in 2007. The resulting data reports should include data on air pressure and airflow for each air sparge well. The next LFAS evaluation report submitted should include new redox cross-sections as well as a clear description of how each well data is classified as oxic or as sulfate-, iron-, manganese-, or nitrate-reducing.	N	Y
The SOW appended to the recent CD states that the LFAS system must restore the groundwater within a reasonable time period. A reasonable time period is based on a number of site-specific factors as well as the remediation technologies employed. The GCOU ROD anticipated a period of 30 years to restore groundwater at the Site; however, it is difficult to predict the time that will be required to achieve groundwater cleanup goals under the LFAS system. Groundwater data evaluated so far do not show a significant overall trend in contaminant reduction throughout the aquifer, which will be necessary if the remedy is to achieve cleanup goals within a reasonable time period.	N	Y
The PRP has agreed to run a selective ion monitoring (SIM) scan, which can achieve a LOD of 0.01 ppb for VC, for monthly samples at "offsite" wells. "Offsite" quarterly and semiannually VC samples will also receive a SIM scan. However, quarterly and semiannual "onsite" samples will only receive a SIM scan if they come up no detect under the existing EPA method. The groundwater cleanup standard applies to all locations beyond the waste boundary; hence, a SIM scan should also be run for all wells except those with consistently high VC levels.	N	Y
In order for the remedy to be protective in the long-term, effective ICs must be implemented and maintained.	N	Y

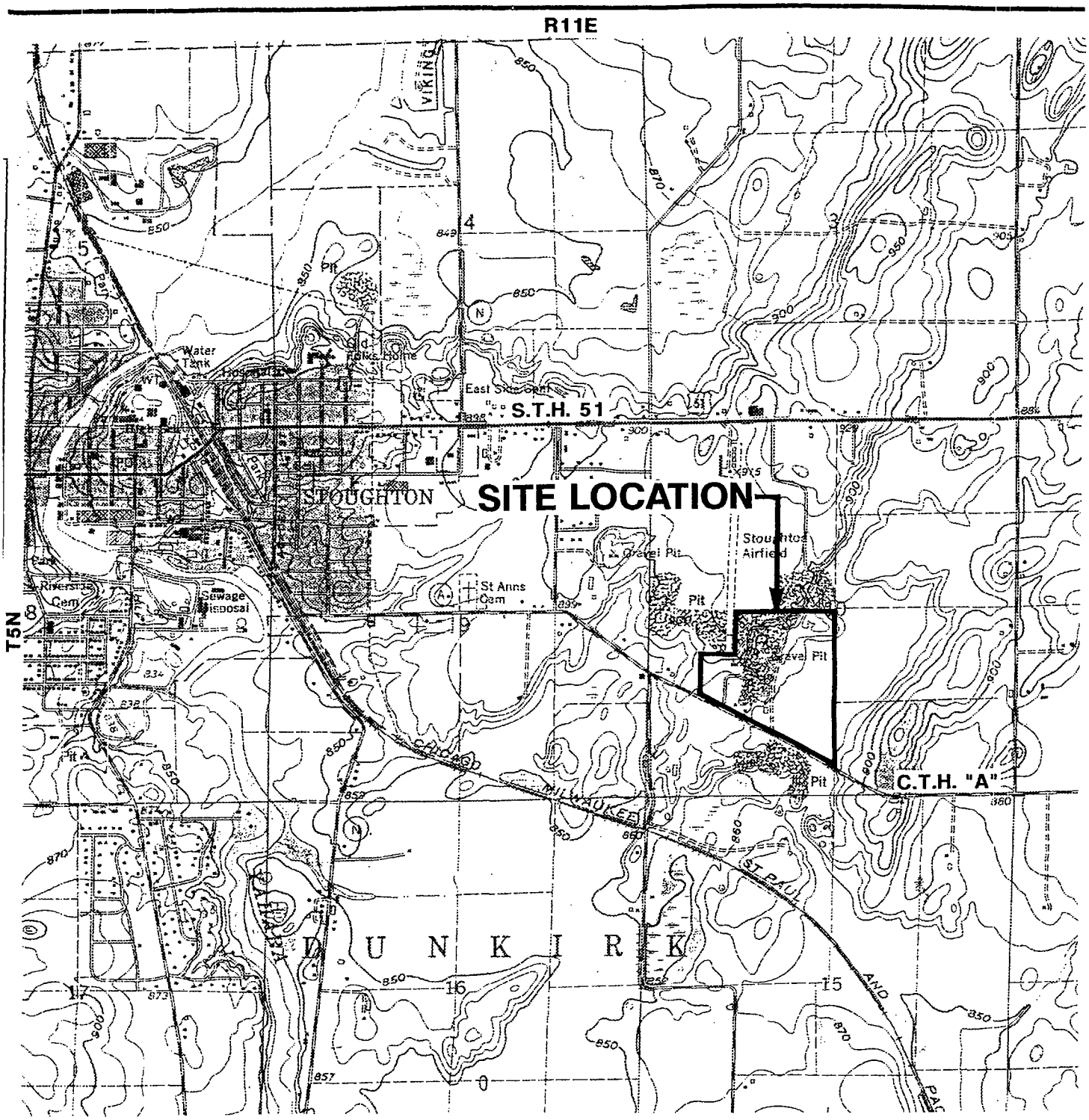
IX. Recommendations and Follow-Up Actions

Based on the issues identified in the previous table, the following recommendations are made to resolve the issues.

TABLE 7 – Recommendations and Follow up Actions

ISSUE	Recommendations and Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness(Y/N)	
					Current	Future
U.S. EPA and WDNR believe the expanded air sparging remedy should continue operating without the groundwater pump and treat system for another six months, until April 1, 2007. Six months will enable the expanded system to complete the agreed probationary operation period and to generate the necessary data for evaluating its effectiveness. However, increased pressures and airflows are needed in order for the LFAS to achieve greater effectiveness.	1) PRP should measure and increase air pressure in the AS wells in order to achieve greater airflows in the aquifer. 2) The PRP should prepare and submit a final LFAS evaluation report to U.S. EPA and WDNR for review. 3) The agencies must review the LFAS report and evaluate its effectiveness vis-à-vis the pump and treat system.	PRP	U.S. EPA, with WDNR input	Ongoing June 1, 2007 July 2007	N	Y
Monthly monitoring should continue in the same wells currently monitored on a monthly basis until late in 2007. The resulting reports should include data on air pressure and airflow for each air sparge well. The next LFAS evaluation report submitted should include new redox cross-sections as well as a clear description of how each well data is classified as oxic or as sulfate-, iron-, manganese-, or nitrate-reducing.	Discuss with PRP Provide U.S. EPA technical input as needed	PRP	U.S. EPA, with WDNR input	Ongoing, monthly June 2007	N	Y

ISSUE	Recommendations and Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness(Y/N)	
					Current	Future
The SOW appended to the recent CD states that the LFAS system must restore the groundwater within a reasonable time period. The GCOU ROD anticipated a period of 30 years to restore groundwater at the Site; however, it is difficult to predict the time that will be required to achieve groundwater cleanup goals under the LFAS system. Groundwater data evaluated so far do not show a significant overall trend in contaminant reduction throughout the aquifer, which will be necessary if the remedy is to achieve cleanup goals within a reasonable time period.	1) The groundwater pump and treat system should remain onsite and operable, should its use be indicated. 2) Meet with the PRP to discuss agency expectations for demonstrating LFAS effectiveness. 3) The PRP should investigate strategies for ensuring uninterrupted groundwater restoration should the LFAS system be found ineffective by the agencies.	PRP	U.S. EPA, with WDNR input	Ongoing February 2007 July 2007	N	Y
The PRP performs a selective ion monitoring (SIM) scan, which provides a LOD of 0.01 ppb for VC, for monthly samples at "offsite" wells. "Offsite" quarterly and semiannual VC samples also receive a SIM scan. However, quarterly and semiannual "onsite" samples only receive a SIM scan if they come up no detect under the existing EPA method. The groundwater cleanup standard applies to all locations beyond the waste boundary; hence, a SIM scan should also be run for all wells except those with consistently high VC levels.	To achieve SIM scan for all wells except those with anticipated or consistently high vinyl chloride.	PRP	U.S. EPA, with WDNR input	December 2006	N	Y
In order for the remedy to be protective in the long-term, effective ICs must be implemented and maintained.	An IC plan should be prepared and include: 1) evaluating the effectiveness and enforceability of the ICs and plan corrective actions, if necessary; 2) update IC maps to include the areas where groundwater exceeds cleanup standards overlaid with specific parcels; and, 3) amend the O&M plan to include regular inspections of the Site ICs, annual certification to EPA that ICs are in-place and effective, and a communications plan. Explore using a "one-call" system for ICs to ensure long-term stewardship of the Site.	U.S. EPA	U.S. EPA, with WDNR input	March 2007	N	Y



NOTES

1. BASE MAP DEVELOPED FROM THE STOUGHTON, WISCONSIN 7 1/2 MINUTE *U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP*, DATED 1961, PHOTOREVISED 1982.

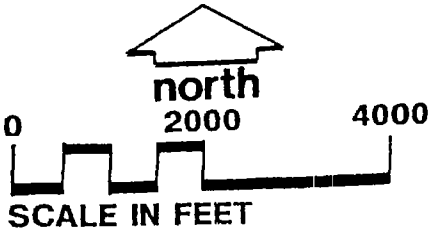


Figure 1

X. Protectiveness Statement

The remedy at the Hagen Farm Superfund Site currently protects human health and the environment because the source of contamination is not accessible to humans. Under a source control operable unit, the onsite contamination has been consolidated and capped. Institutional controls, including fencing and deed restrictions, have also been implemented to prevent current and future exposures to onsite groundwater. Under the groundwater control operable unit, residences downgradient of the Site that rely on private groundwater wells are sampled on an annual basis to ensure their groundwater is safe.

For the remedy to be protective in the long-term, however, the groundwater cleanup standards must be achieved at the waste boundary. In order to accomplish this, the low flow air sparging system needs to be reevaluated at the conclusion of the two-year probationary period, and the process outlined in the recent CD needs to be followed to ensure that an effective groundwater restoration system is in place. Long-term protectiveness is also dependent upon effective institutional controls at the Site. U.S. EPA is assessing the ICs at the Site and will develop an IC plan within six months to complete the review, determine whether any immediate changes are necessary, and implement the changes in a timely manner.

XI. Next Review

The next statutory five-year review for the Hagen Farm Superfund Site is required by September 2011, five years from the date of this review.

Figures

Site Features

Superfund
U.S. Environmental Protection Agency

Hagen Farm
Dane County, WI

WID980610059

Legend

- Hagen Farm Property
- Fence
- Capped Main Disposal Area
- Groundwater Treatment Building
- Ditch
- Ponds
- Wisconsin and Southern Railroad

0 300 600 Feet

N

GEOS

Created by Sarah Backhouse
U.S. EPA Region 5 on 9/18/06

Figure 2

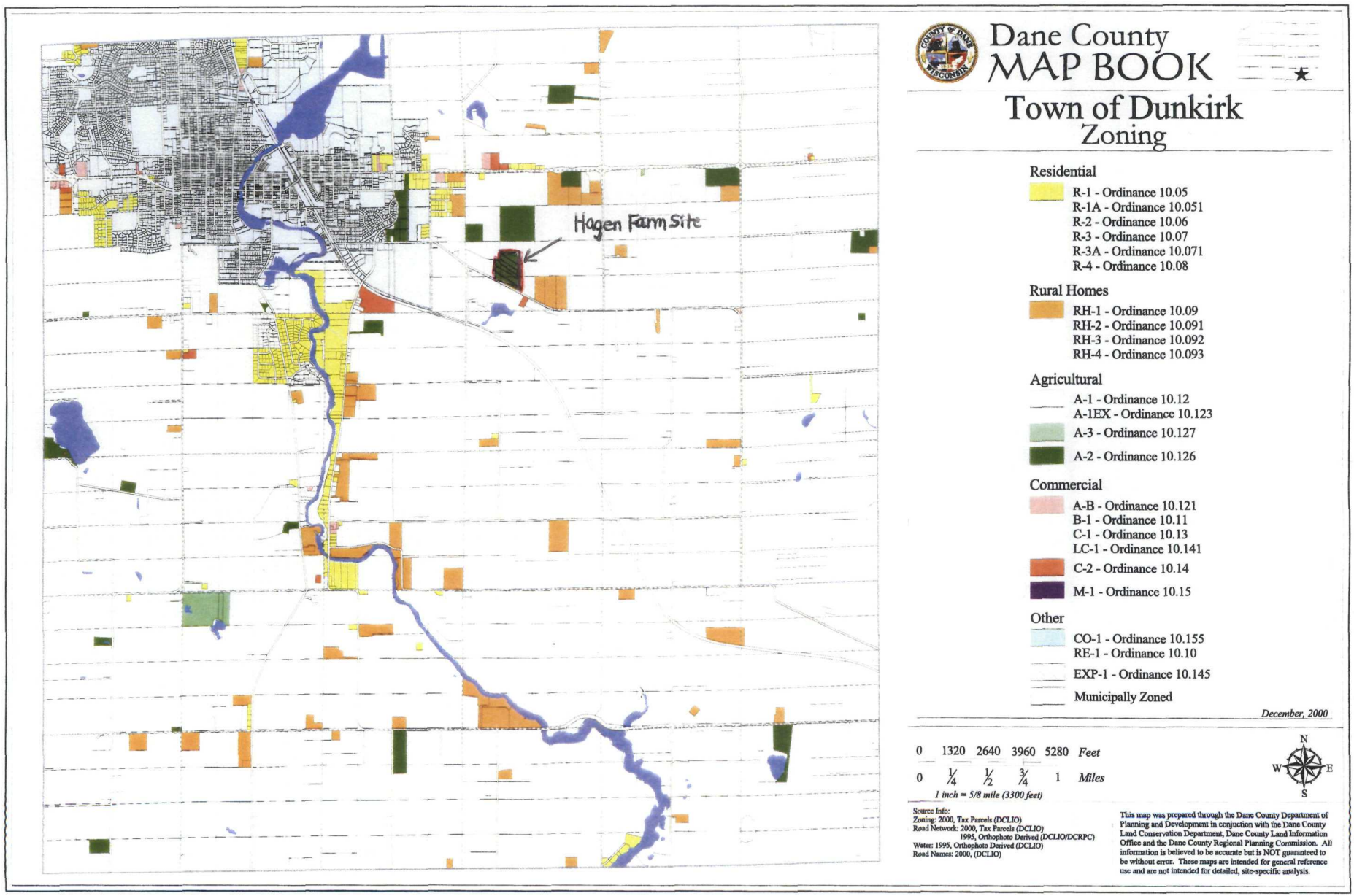

Hagen Farm Site
Dane County
MAP BOOK
Town of Dunkirk
Zoning
Residential
R-1 - Ordinance 10.05
R-1A - Ordinance 10.051
R-2 - Ordinance 10.06
R-3 - Ordinance 10.07
R-3A - Ordinance 10.071
R-4 - Ordinance 10.08
Rural Homes
RH-1 - Ordinance 10.09
RH-2 - Ordinance 10.091
RH-3 - Ordinance 10.092
RH-4 - Ordinance 10.093
Agricultural
A-1 - Ordinance 10.12
A-1EX - Ordinance 10.123
A-3 - Ordinance 10.127
A-2 - Ordinance 10.126
Commercial
A-B - Ordinance 10.121
B-1 - Ordinance 10.11
C-1 - Ordinance 10.13
LC-1 - Ordinance 10.141
C-2 - Ordinance 10.14
M-1 - Ordinance 10.15
Other
CO-1 - Ordinance 10.155
RE-1 - Ordinance 10.10
EXP-1 - Ordinance 10.145
Municipally Zoned
December, 2000
0 1320 2640 3960 5280 Feet
0 1/4 1/2 3/4 1 Miles
1 inch = 5/8 mile (3300 feet)
N
W
E
S
Source Info:
Zoning: 2000, Tax Parcels (DCLIO)
Road Network: 2000, Tax Parcels (DCLIO)
1995, Orthophoto Derived (DCLIO/DCRPC)
Water: 1995, Orthophoto Derived (DCLIO)
Road Names: 2000, (DCLIO)
This map was prepared through the Dane County Department of Planning and Development in conjuction with the Dane County Land Conservation Department, Dane County Land Information Office and the Dane County Regional Planning Commission. All information is believed to be accurate but is NOT guaranteed to be without error. These maps are intended for general reference use and are not intended for detailed, site-specific analysis.

Figure 3

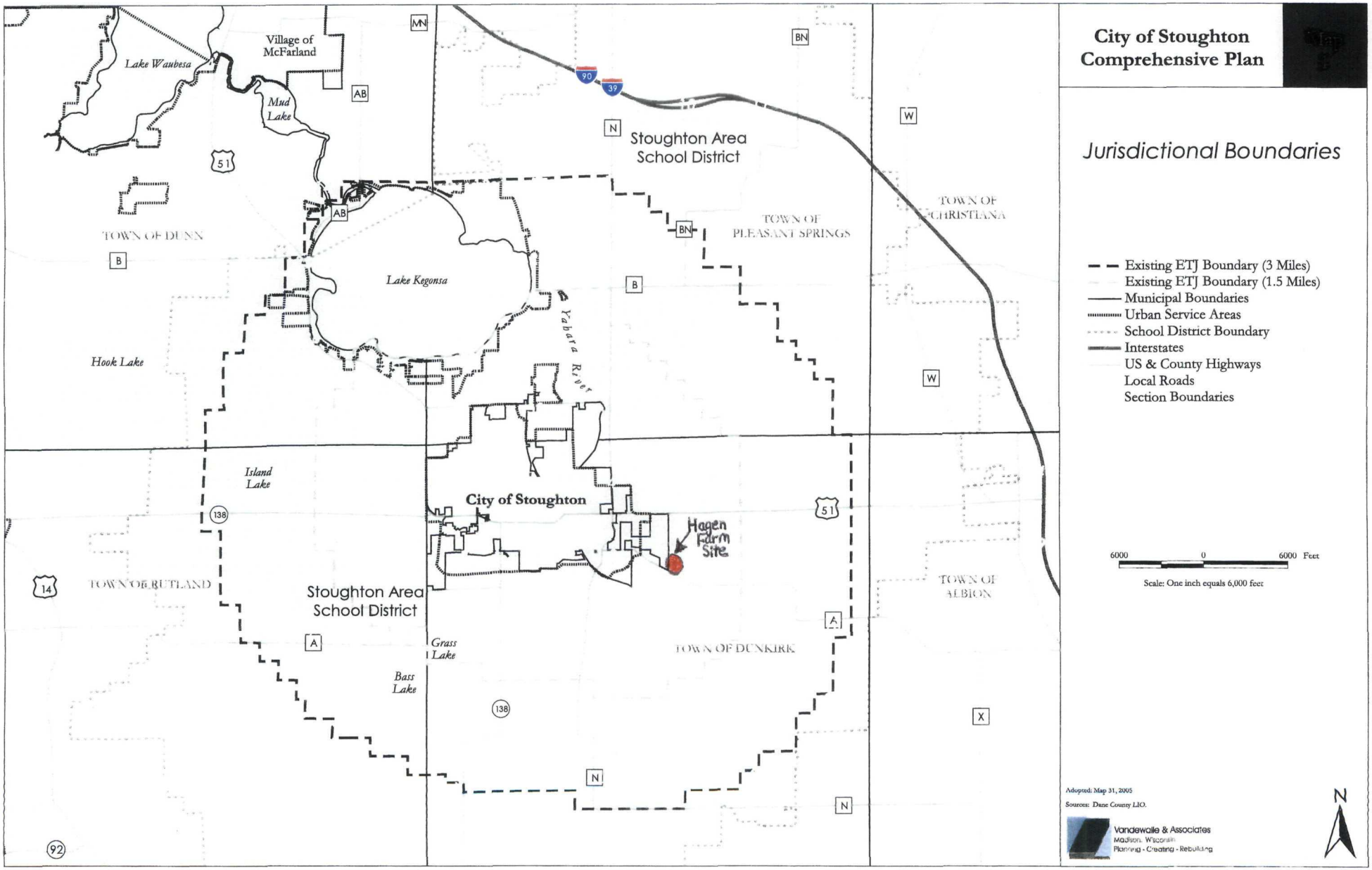

City of Stoughton
Comprehensive Plan
Jurisdictional Boundaries
Existing ETJ Boundary (3 Miles)
Existing ETJ Boundary (1.5 Miles)
Municipal Boundaries
Urban Service Areas
School District Boundary
Interstates
US & County Highways
Local Roads
Section Boundaries
6000 0 6000 Feet
Scale: One inch equals 6,000 feet
Adopted: May 31, 2005
Sources: Dane County LIO.
Vandewalle & Associates
Madison, Wisconsin
Planning - Creating - Rebuilding
N
Village of McFarland
Lake Waubesa
Mud Lake
Lake Kegonsa
Hook Lake
Island Lake
Grass Lake
Bass Lake
Yahara River
Stoughton Area School District
TOWN OF DUNN
TOWN OF PLEASANT SPRINGS
TOWN OF CHRISTIANA
TOWN OF RUTLAND
TOWN OF DUNKIRK
TOWN OF ALBION
City of Stoughton
Hagen Farm Site

Figure 4

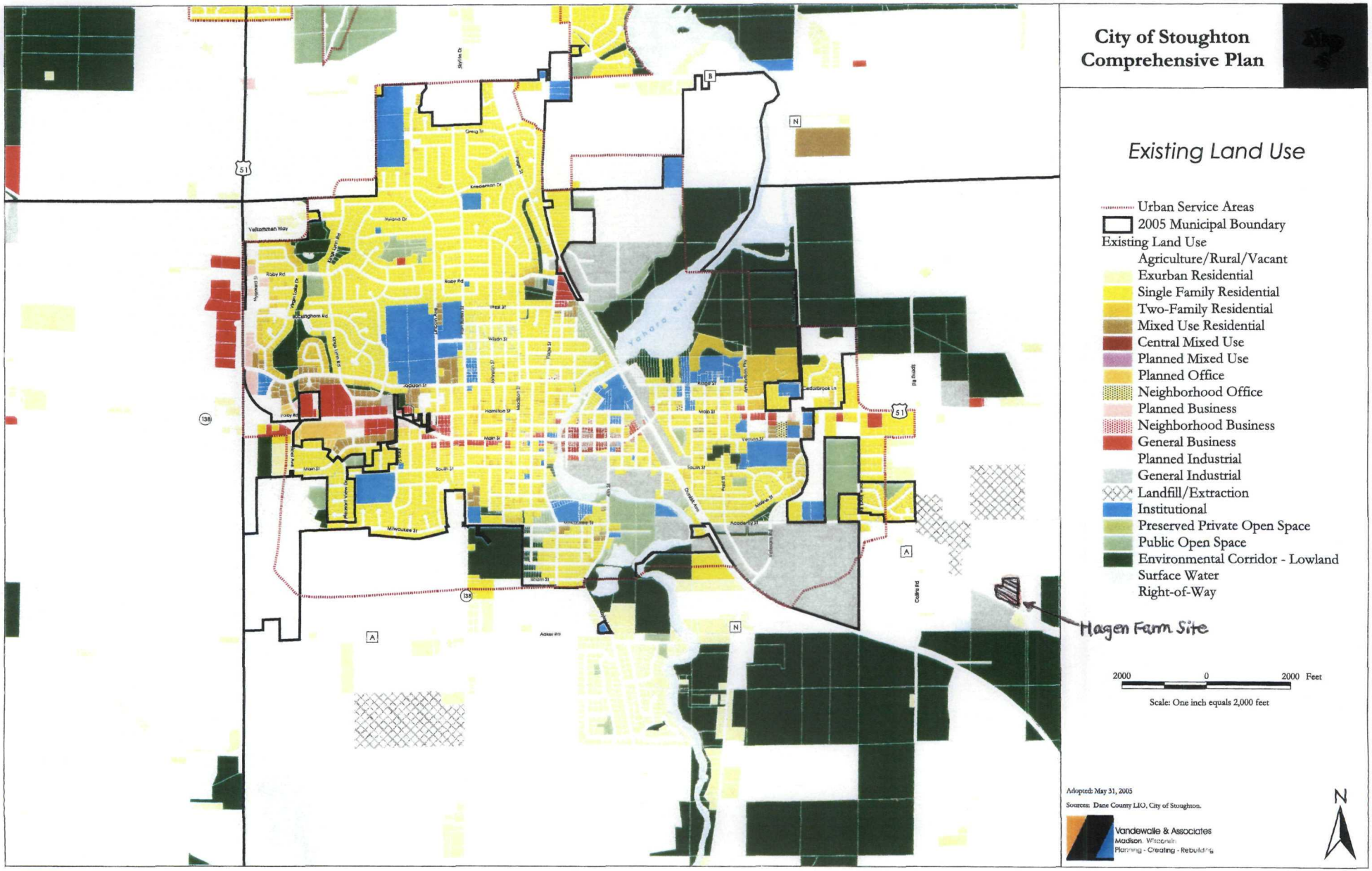

City of Stoughton
Comprehensive Plan
Existing Land Use
Urban Service Areas
2005 Municipal Boundary
Existing Land Use
Agriculture/Rural/Vacant
Exurban Residential
Single Family Residential
Two-Family Residential
Mixed Use Residential
Central Mixed Use
Planned Mixed Use
Planned Office
Neighborhood Office
Planned Business
Neighborhood Business
General Business
Planned Industrial
General Industrial
Landfill/Extraction
Institutional
Preserved Private Open Space
Public Open Space
Environmental Corridor - Lowland
Surface Water
Right-of-Way
Hagen Farm Site
2000 0 2000 Feet
Scale: One inch equals 2,000 feet
Adopted: May 31, 2005
Sources: Dane County LIO, City of Stoughton.
Vandewalle & Associates
Madison, Wisconsin
Planning - Creating - Rebuilding
N

Figure 5

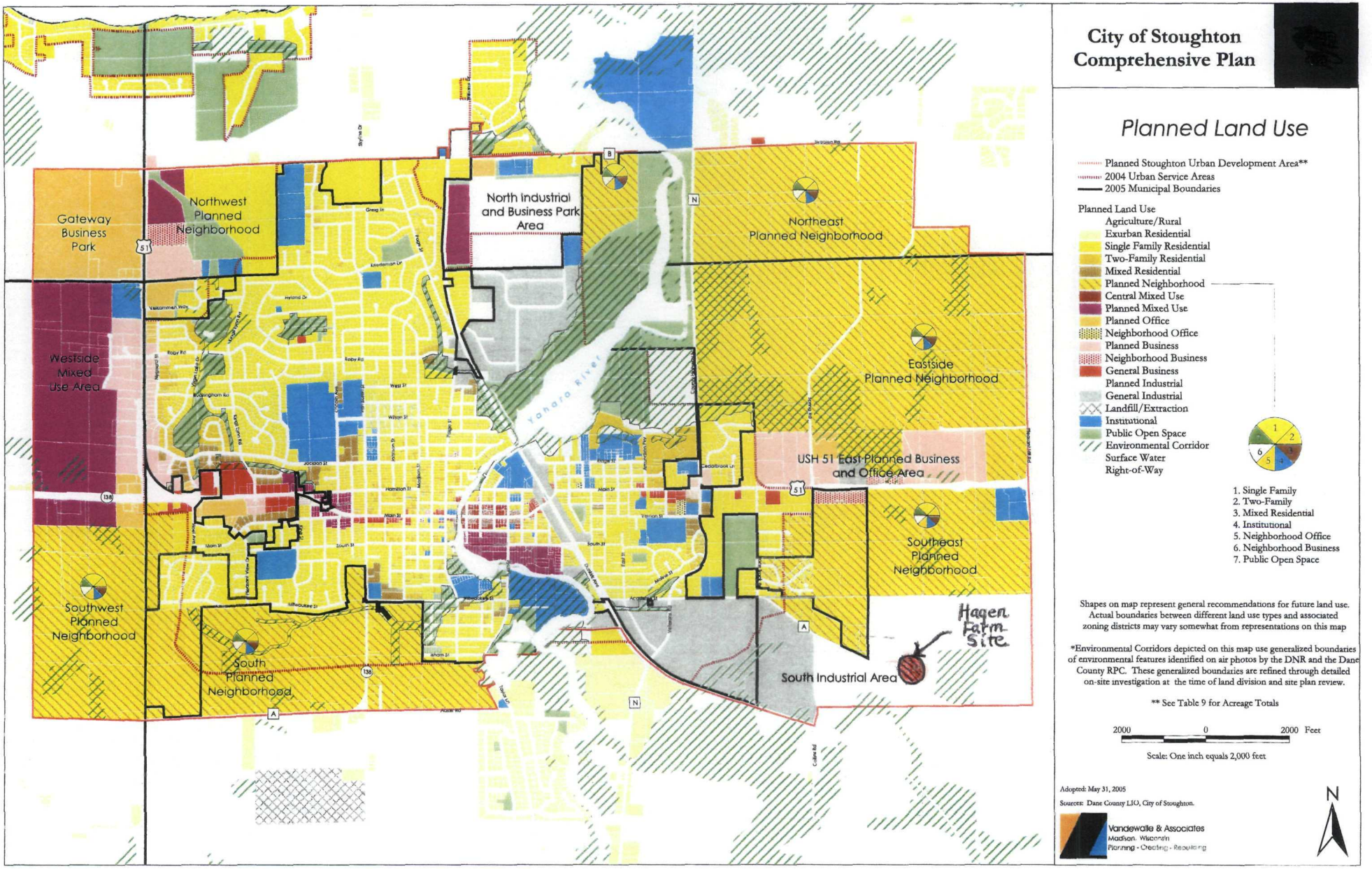
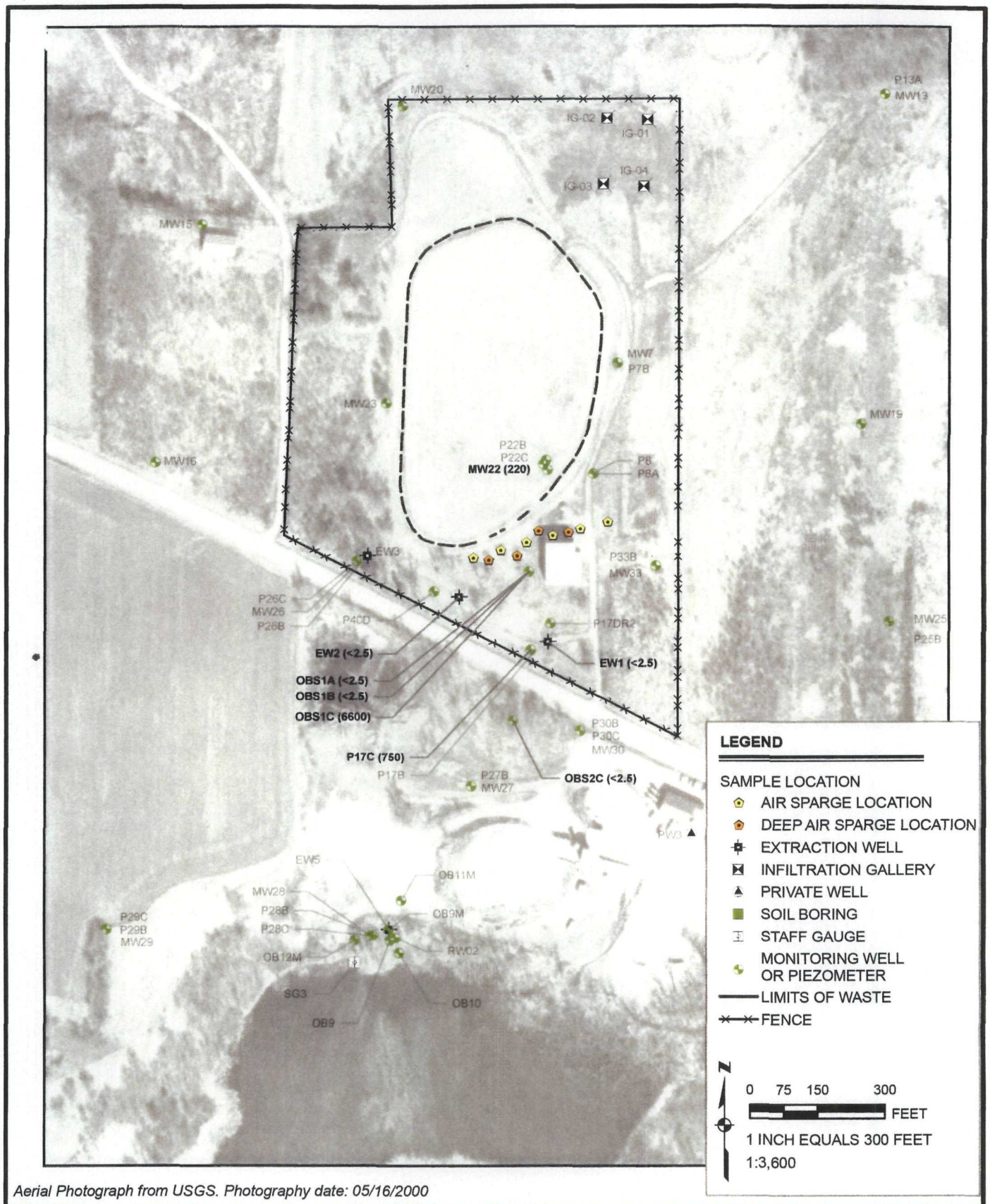

City of Stoughton
Comprehensive Plan
Planned Land Use
Planned Stoughton Urban Development Area**
2004 Urban Service Areas
2005 Municipal Boundaries
Planned Land Use
Agriculture/Rural
Exurban Residential
Single Family Residential
Two-Family Residential
Mixed Residential
Planned Neighborhood
Central Mixed Use
Planned Mixed Use
Planned Office
Neighborhood Office
Planned Business
Neighborhood Business
General Business
Planned Industrial
General Industrial
Landfill/Extraction
Institutional
Public Open Space
Environmental Corridor
Surface Water
Right-of-Way
1. Single Family
2. Two-Family
3. Mixed Residential
4. Institutional
5. Neighborhood Office
6. Neighborhood Business
7. Public Open Space
Shapes on map represent general recommendations for future land use. Actual boundaries between different land use types and associated zoning districts may vary somewhat from representations on this map
*Environmental Corridors depicted on this map use generalized boundaries of environmental features identified on air photos by the DNR and the Dane County RPC. These generalized boundaries are refined through detailed on-site investigation at the time of land division and site plan review.
** See Table 9 for Acreage Totals
2000 0 2000 Feet
Scale: One inch equals 2,000 feet
Adopted: May 31, 2005
Sources: Dane County LIO, City of Stoughton.
Vandewalle & Associates
Madison, Wisconsin
Planning • Creating • Regulating
N
Gateway Business Park
Northwest Planned Neighborhood
North Industrial and Business Park Area
Northeast Planned Neighborhood
Westside Mixed Use Area
Yahara River
Eastside Planned Neighborhood
USH 51 East Planned Business and Office Area
Southeast Planned Neighborhood
Hagen Farm Site
Southwest Planned Neighborhood
South Planned Neighborhood
South Industrial Area

Figure 6



Aerial Photograph from USGS. Photography date: 05/16/2000

RMT
744 Heartland Trail
Madison, WI 53717 - 1934
P.O. Box 8923
Madison, WI 53708 - 8923
Phone: 608-831-4444
Fax: 608-831-3021

THF RESULTS, 08/01/2005

HAGEN FARM SITE
TOWN OF DUNKIRK, WISCONSIN

DRAWN BY:	HANKLEY C
APPROVED BY:	QUINN K
PROJ. NO.:	00-07151.02
FILE NO.:	71510201.mxd
DATE:	NOVEMBER 2005

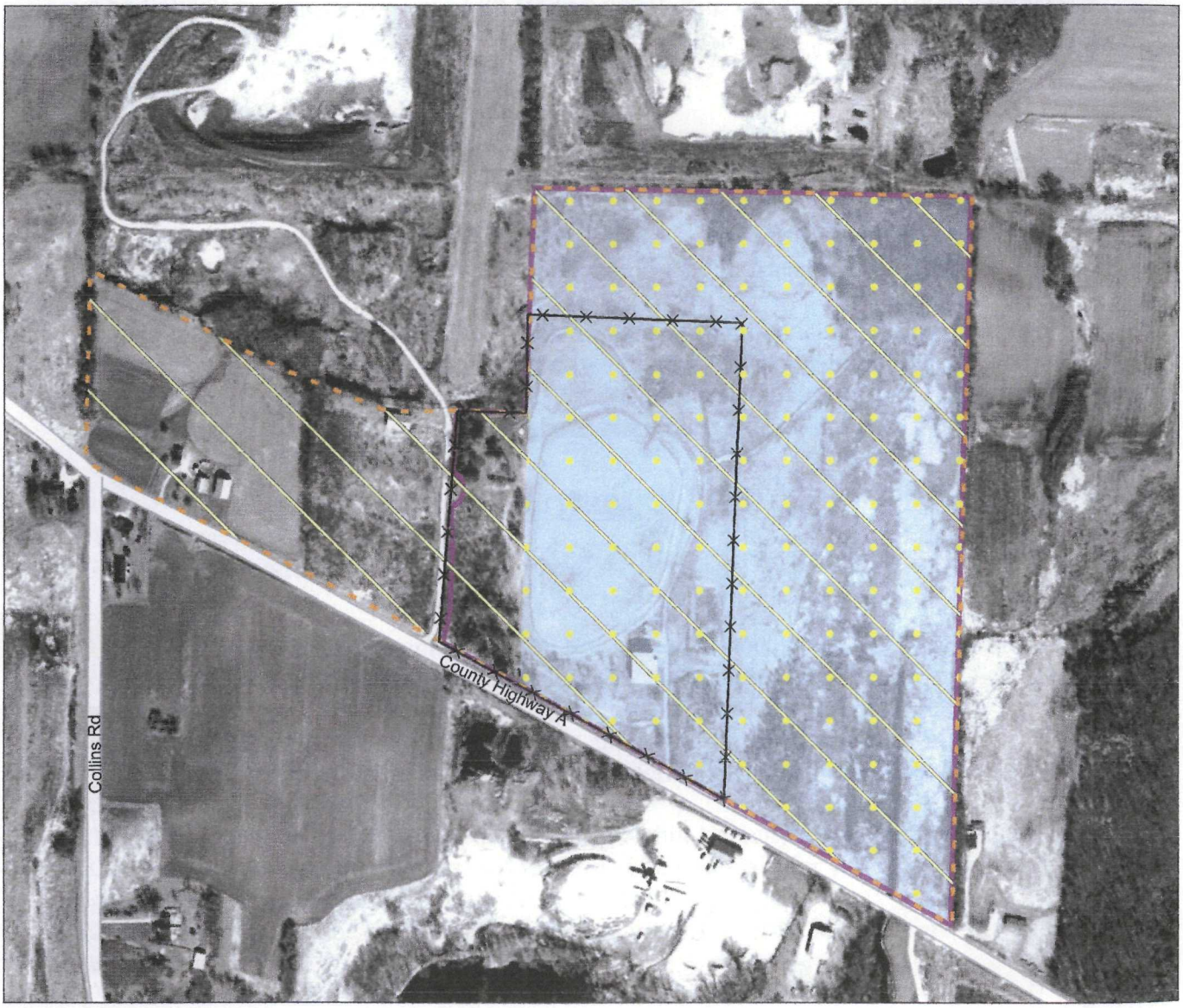
Figure 7

Institutional Control (IC) Review
Implemented Institutional Controls

Superfund
U.S. Environmental Protection Agency

Hagen Farm
Dane County, WI

WID980610059



Legend *

- Hagen Farm Property
- Fence
- Land and Groundwater Use Restrictions (1991) - Implemented IC
- Groundwater Use Restrictions (1992) - Implemented IC
- WDNR Approved Private Water System Area (1995) - Implemented IC

0 200 400 Feet

N

GEOS

* Please see Attachment 1 for Summary of Institutional Controls

EPA Disclaimer: Please be advised that areas depicted in the map have been estimated. The map does not create any rights enforceable by any party. EPA may refine or change this data and map at any time.

Created by Sarah Backhouse
U.S. EPA Region 5 on 9/18/06

Figure 8

Summary of Institutional Controls

Hagen Farm Superfund Site (WID980610059) Institutional Control Review

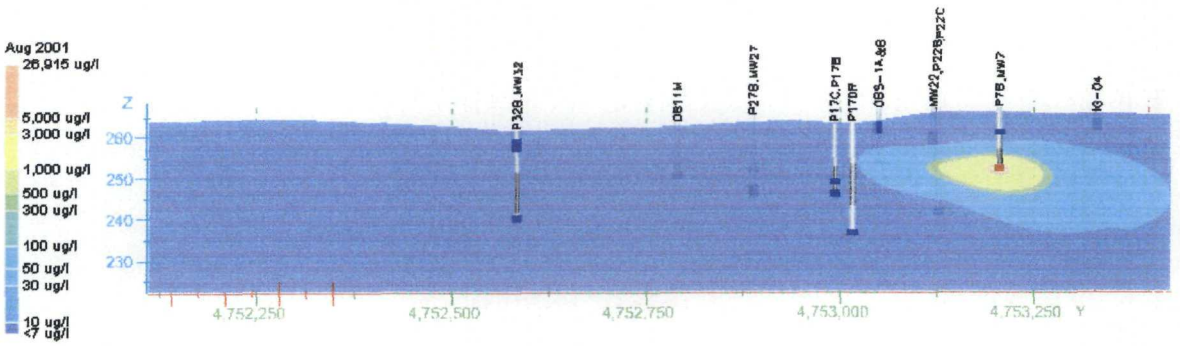
The following summary is based on Dane County Register of Deeds (Dane County, WI).

Dane County Deed Restriction (1991)
The following actions are prohibited:
1. Any consumptive or other use of the groundwater that could cause exposure to humans or animals.
2. Any use of, or activity that may interfere with the work to be performed at the Hagen Farm site as required by an U.S. Environmental Protection Agency (U.S. EPA) Administrative Order.
3. Any residential or commercial use, including but not limited to any filling, grading, excavating, building, drilling, mining, farming, or other development, or placing waste material, except with the approval of the U.S. EPA, in consultation with the State, as consistent with the requirements of the above referenced Administrative Order.

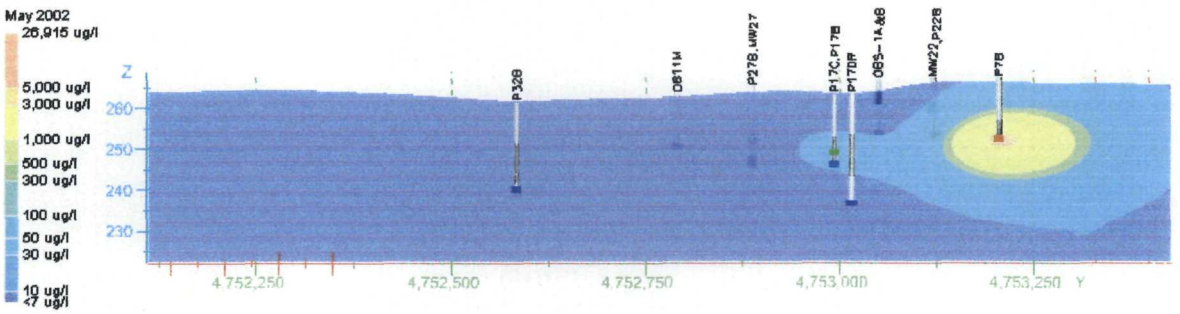
Dane Country Deed Restriction (1992)
The following action is prohibited:
1. The installation of any drinking water wells.

Wisconsin Department of Natural Resources (WDNR) approval document (1995); based on the provision of chapter NR 812, Wisconsin Administrative Code. This code requires a minimum separation of 1,200 feet be provided between a well or reservoir and the nearest edge of an existing, proposed, or abandoned landfill site.
-The WDNR grants an approval for the construction of such a private water system upon the following conditions:
1. That the location of the proposed well site is within a county that is participating in the Country Well delegation program and that it will be necessary for you to obtain a well permit from the county in addition to the variance.
2. That the well shall be located at the proposed location at least 700 feet from the nearest edge of the landfill.
3. That the well shall be constructed with a minimum of 75 feet of well casing.

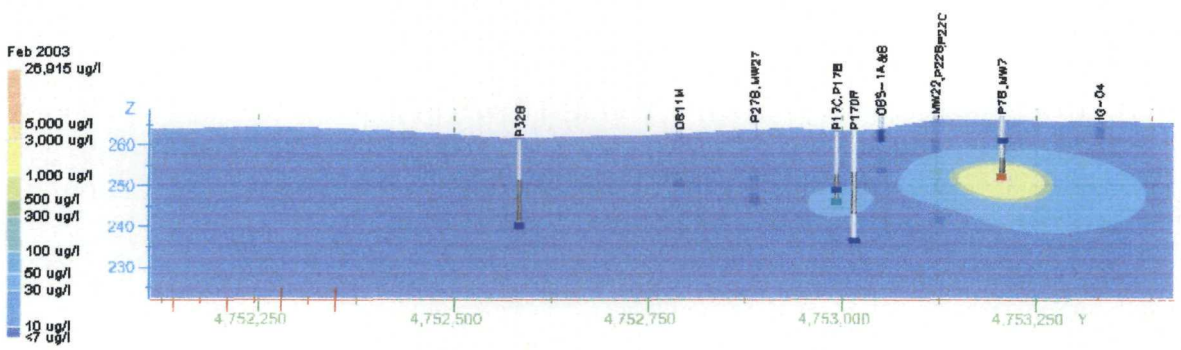
Hagen Farm, THF in Aug 2001



Hagen Farm, THF in May 2002



Hagen Farm, THF in Feb 2003



Hagen Farm, THF in Feb 2004

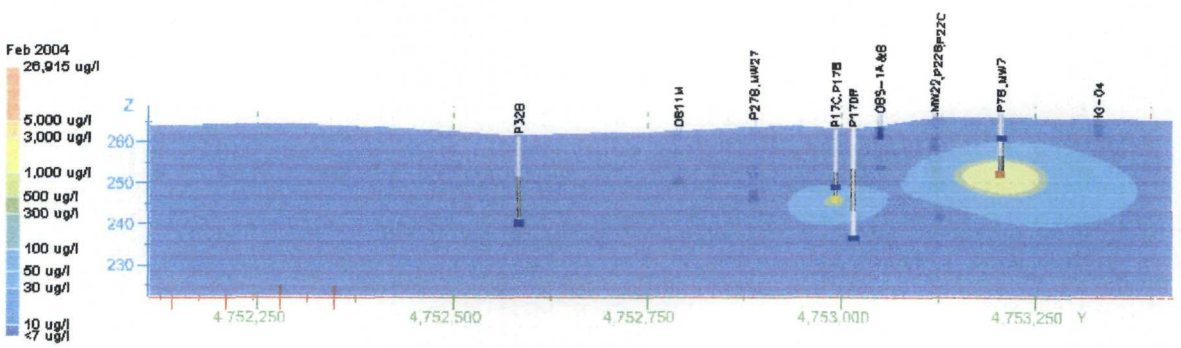


Figure 9

Attachments

Attachment 1 - Waste Management of Wisconsin Site inspection forms
Attachment 2 - Groundwater Data trend plots for Key Wells
Attachment 3 - VOC and DO Groundwater Data Tables from the March 30, 2006 Low Flow Air Sparge Report
Attachment 4 - Summary of monitoring schedule under the LFAS probationary period
Attachment 5 - Newspaper notice announcing start of five-year review
Attachment 6 - Documents used during five-year review
Attachment 7 - Five-year review site inspection checklist for Hagen Farm (5/11/06)
Attachment 8 - Photography log from May 11, 2006 five-year review inspection

Attachment 1 – Waste Management of Wisconsin, Inc. Site Inspection Forms

Waste Management, Inc.

CLOSED LANDFILL ENVIRONMENTAL INSPECTION FORM

11:45 AM

FACILITY NAME: HAGEN FARM INSPECTION DATE 10/4/05

LOCATION (Physical address: *not* P.O.Box number) 2318 County Highway A

CITY Stoughton STATE WI ZIPCODE 53589

TOTAL ACREAGE: 28 FILLED ACREAGE: 10

DATE FACILITY STOPPED RECEIVING WASTE: 8/1/66

OWNER STATUS Owned DATE OF LAST WMNA INSPECTION: 3/14/05

IS THIS FACILITY ON THE NATIONAL PRIORITIES LIST (NPL)? ☒ YES ☐ NO

If yes, date listed on the NPL 6/10/87

IF NO, IS THIS FACILITY ON CERCLIS? ☒ YES ☐ NO ☐ NA

If the facility is on CERCLIS what is the date of listing

WEATHER (during inspection): Temperature: upper 70's Conditions: PARTLY CLOUDY WINDY 5-SE

SIGNATURES:

The findings of this inspection were discussed with appropriate personnel, corrective actions were identified and entered into CARS, and an implementation schedule was mutually agreed upon:

Site Engineer Michael L. Peterson DATE 10/5/05

Division President: DATE

cc: Group Environmental Manager

Next Scheduled Inspection Date

	Y	N	NA	CARS
SECURITY & ACCESS				
1. Access controlled by perimeter fencing?	☒	☐	☐	☐
2. "No Trespassing" signs posted in appropriate languages?	☒	☐	☐	☐
3. No evidence of tresspassing?	☒	☐	☐	☐
COVER & VEGETATION				
4. Final cover in acceptable condition? (provide documentation reference in comments section) Good Cover - MOWED	☒	☐	☐	☐
5. Top slope in acceptable condition? (good drainage, minimal erosion)	☒	☐	☐	☐
6. Side slope in acceptable condition? (good drainage, minimal erosion)	☒	☐	☐	☐
7. Acceptable vegetation (quality & density)?	☒	☐	☐	☐
8. No damage to gas and leachate systems ?	☒	☐	☐	☐
9. No exposed waste?	☒	☐	☐	☐
DRAINAGE				
10. Appropriate runoff controls in place? Good Condition - well vegetated	☒	☐	☐	☐
11. Slope drains in acceptable condition?	☒	☐	☐	☐
12. Perimeter ditches in acceptable condition?	☒	☐	☐	☐
13. Detention/retention ponds in acceptable condition?	☒	☐	☐	☐
14. Outlet structures in acceptable condition?	☒	☐	☐	☐
15. Point discharge permitted?	☐	☐	☒	☐
16. Facility is void of standing water where unwanted wetlands may develop?	☒	☐	☐	☐

Waste Management, Inc.

CLOSED LANDFILL ENVIRONMENTAL INSPECTION FORM

LEACHATE & GAS CONTROL SYSTEMS	Y	N	NA	CARS
17. Collection manholes secure and in acceptable condition?	☐	☐	☒	☐
18. Riser and cleanouts secure and in acceptable condition?	☐	☐	☒	☐
19. Approved Leachate Management Plan being implemented?	☐	☐	☒	☐
20. Storage tanks or ponds in acceptable condition and operated in compliance with requirements?	☒	☐	☐	☐
21. Sewer discharge pipe or meter secure and in good condition?	☐	☐	☒	☐
22. Gas flares, vents and gas wells secure and in good condition?	☒	☐	☐	☐
23. No odor migration off-site?	☒	☐	☐	☐
24. No gas migration off-site?	☒	☐	☐	☐
25. Probes/detection system calibrated and in good working condition?	☒	☐	☐	☐
MONITORING WELLS			☐	
26. Documentation of well installation is available in region files?	☒	☐	☐	☐
27. Current ground-water monitoring well inspections filed?	☒	☐	☐	☐

ADDITIONAL FACILITY INFORMATION

Development on or near the site? (Specify size and type; e.g., residential - 40 acres, well and septic)

Site was recently mowed and looks in great condition

1 compressor showing a starter fault

NEED TO EVALUATE the vacuum gauge on the SVE Blower - needle bounces -

COMMENTS:

ITEM #

NOTE:

Response box legend:

Y=YES

N=NO [Response must be identified as a CARS issue unless a comment is made that demonstrates compliance]

NA=Not Applicable

CARS= Compliance Action Reporting System issue

Waste Management, Inc.

CLOSED LANDFILL ENVIRONMENTAL INSPECTION FORM

FACILITY NAME: HAGEN FARM INSPECTION DATE 3/14/05

LOCATION (Physical address; *not* P.O.Box number) 2319 County Highway A

CITY Stoughton STATE WIS ZIPCODE

TOTAL ACREAGE: 28 FILLED ACREAGE: 10

DATE FACILITY STOPPED RECEIVING WASTE: 8/1/06

OWNER STATUS Owned DATE OF LAST WMNA INSPECTION: 6/24/03

IS THIS FACILITY ON THE NATIONAL PRIORITIES LIST (NPL)? ☒ YES ☐ NO

If yes, date listed on the NPL

IF NO, IS THIS FACILITY ON CERCLIS? ☒ YES ☐ NO ☐ NA

If the facility is on CERCLIS what is the date of listing

WEATHER (during inspection): Temperature: low 30's Conditions: Sunny Slight Breez

SIGNATURES:

The findings of this inspection were discussed with appropriate personnel, corrective actions were identified and entered into CARS, and an implementation schedule was mutually agreed upon:

Site Engineer Michael L. Peterson DATE 3/28/05

Division President: DATE

cc: Group Environmental Manager

Next Scheduled Inspection Date

	Y	N	NA	CAR
SECURITY & ACCESS				
1. Access controlled by perimeter fencing?	☒	☐	☐	☐
2. "No Trespassing" signs posted in appropriate languages? NEED A FEW MORE SIGNS	☒	☐	☐	☐
3. No evidence of tresspassing?	☒	☐	☐	☐
COVER & VEGETATION				
4. Final cover in acceptable condition? (provide documentation reference in comments section)	☒	☐	☐	☐
5. Top slope in acceptable condition? (good drainage, minimal erosion)	☒	☐	☐	☐
6. Side slope in acceptable condition? (good drainage, minimal erosion)	☒	☐	☐	☐
7. Acceptable vegetation (quality & density)?	☒	☐	☐	☐
8. No damage to gas and leachate systems ? NOTE	☒	☐	☐	☐
9. No exposed waste?	☒	☐	☐	☐
DRAINAGE				
10. Appropriate runoff controls in place?	☒	☐	☐	☐
11. Slope drains in acceptable condition?	☒	☐	☐	☐
12. Perimeter ditches in acceptable condition?	☒	☐	☐	☐
13. Detention/retention ponds in acceptable condition?	☒	☐	☐	☐
14. Outlet structures in acceptable condition?	☒	☐	☐	☐
15. Point discharge permitted?	☐	☐	☒	☐
16. Facility is void of standing water where unwanted wetlands may develop?	☒	☐	☐	☐

Waste Management, Inc.

CLOSED LANDFILL ENVIRONMENTAL INSPECTION FORM

LEACHATE & GAS CONTROL SYSTEMS	Y	N	NA	CARS
17. Collection manholes secure and in acceptable condition?	☐	☐	☒	☐
18. Riser and cleanouts secure and in acceptable condition?	☐	☐	☒	☐
19. Approved Leachate Management Plan being implemented?	☐	☐	☒	☐
20. Storage tanks or ponds in acceptable condition and operated in compliance with requirements?	☐	☐	☒	☐
21. Sewer discharge pipe or meter secure and in good condition?	☐	☐	☒	☐
22. Gas flares, vents and gas wells secure and in good condition?	☒	☐	☐	☐
23. No odor migration off-site?	☒	☐	☐	☐
24. No gas migration off-site?	☒	☐	☐	☐
25. Probes/detection system calibrated and in good working condition?	☒	☐	☐	☐
MONITORING WELLS				
26. Documentation of well installation is available in region files?	☒	☐	☐	☐
27. Current ground-water monitoring well inspections filed?	☒	☐	☐	☐

ADDITIONAL FACILITY INFORMATION

Development on or near the site? (Specify size and type; e.g., residential - 40 acres, well and septic)

SVE #5 - Sample port
GP 13, 14 need a Lock

Pic #1 MW-23; Pic #2 SVE 3; Pic #3 Ingress Pic 4 Drill Rig
Pic #5 LF NE; Pic #6 MW-24; Pic #7 east side
Additional Pics of Fence and OBS 2C location

COMMENTS:

ITEM #	
	NEED TO REPLACE A few locks on the GP covers.
	NEED TO REPLACE SAMPLE PORTS on SVE wells.

NOTE:

Response box legend:

Y=YES

N=NO [Response must be identified as a CARS issue unless a comment is made that demonstrates compliance]

NA=Not Applicable

CARS= Compliance Action Reporting System issue

Hagen Farm Site Visit Inspection 10/14/05

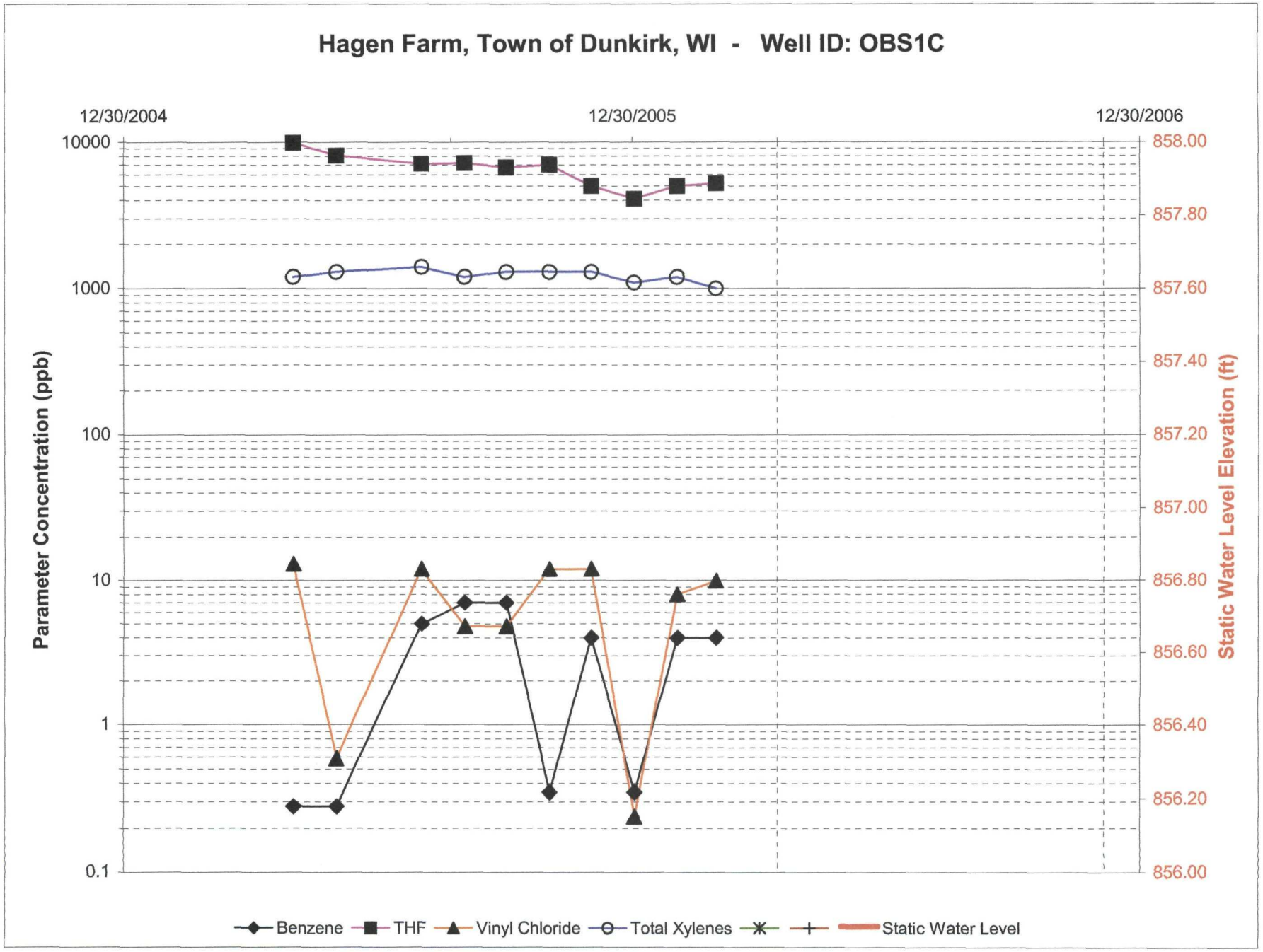
- Site looks Good
- Mowed recently
- SVE OPERATIONAL
- Air Sparge operational however 1 compressor shows starter fault
- Fence OK -
- Signs OK
- No sign of trespass

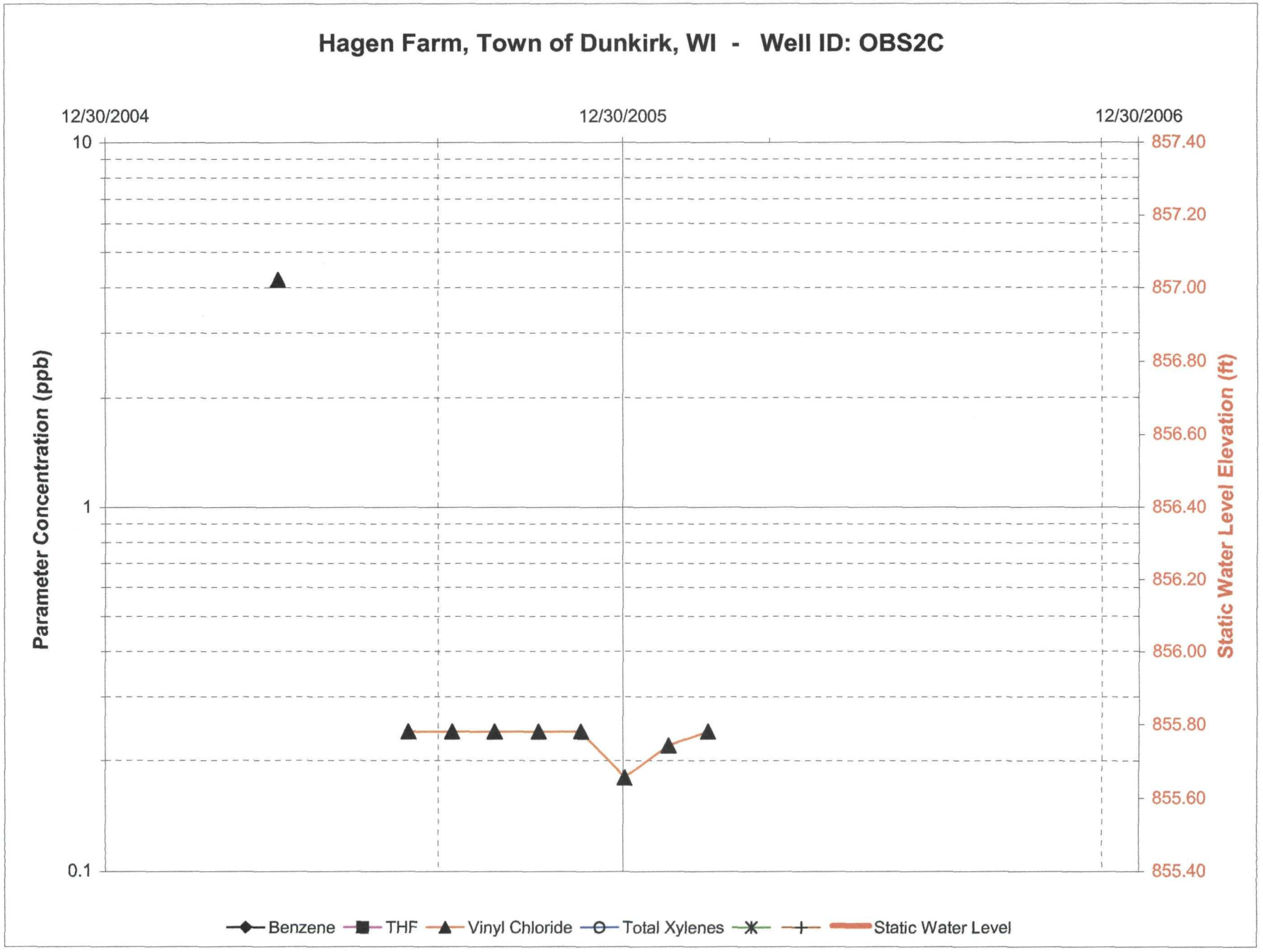
Stormwater ditches and pond OK

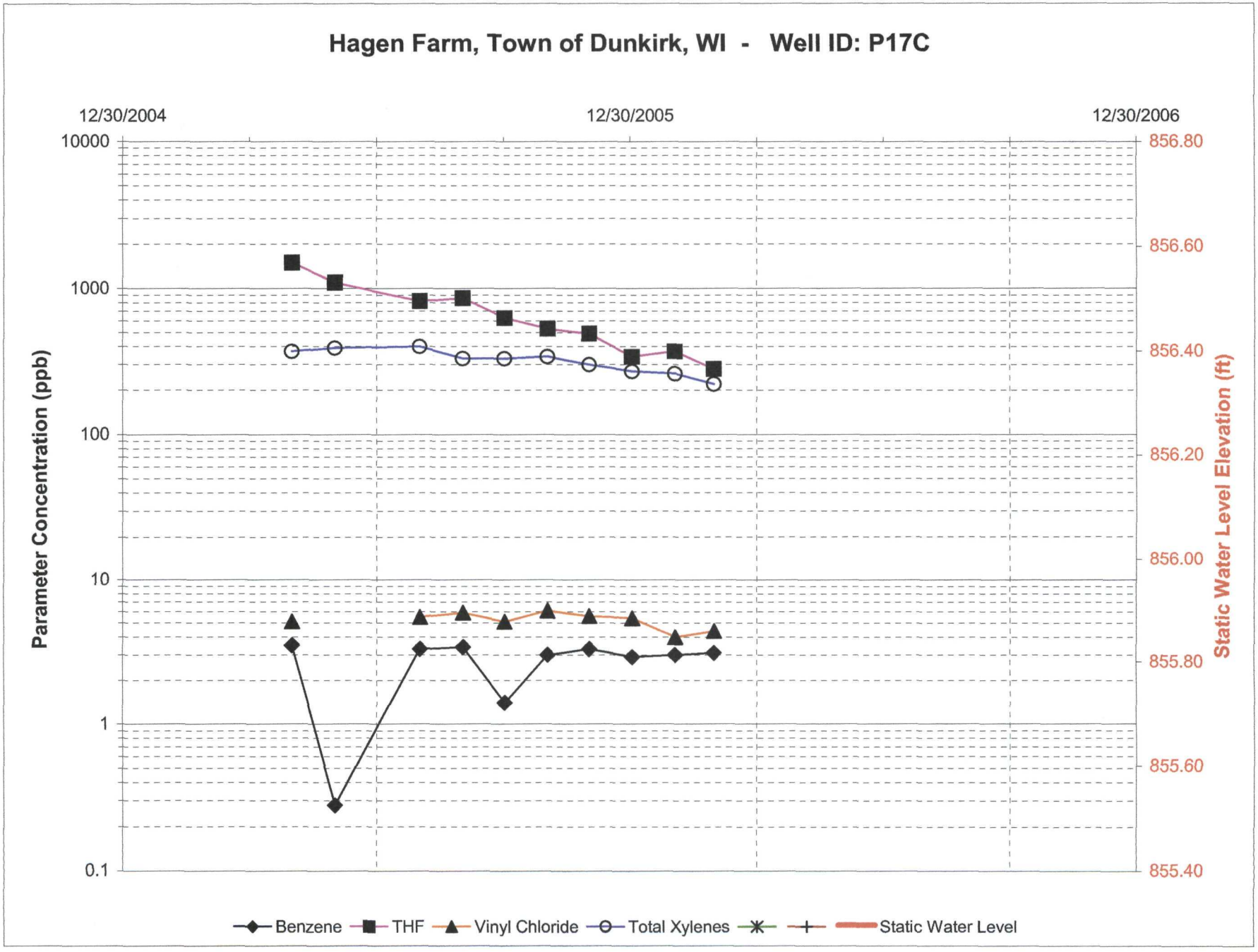
Partly Cloudy Humid wind from South mid 70's

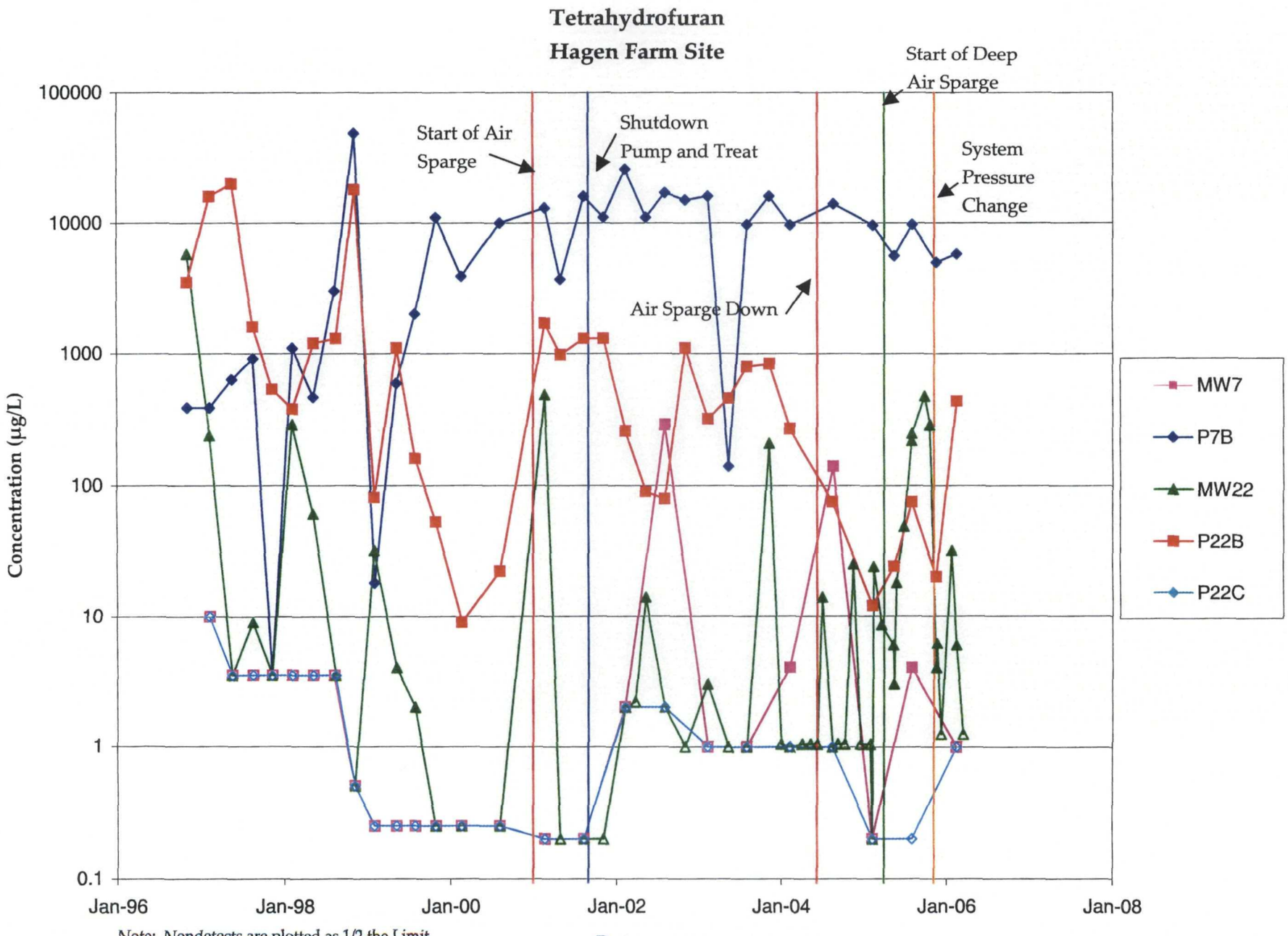
City Disposal Site Visit,

Attachment 2 – Groundwater Data Trend Plots for Key Wells


Hagen Farm, Town of Dunkirk, WI - Well ID: OBS1C
12/30/2004
12/30/2005
12/30/2006
10000
1000
100
10
1
0.1
Parameter Concentration (ppb)
858.00
857.80
857.60
857.40
857.20
857.00
856.80
856.60
856.40
856.20
856.00
Static Water Level Elevation (ft)
Benzene
THF
Vinyl Chloride
Total Xylenes
Static Water Level

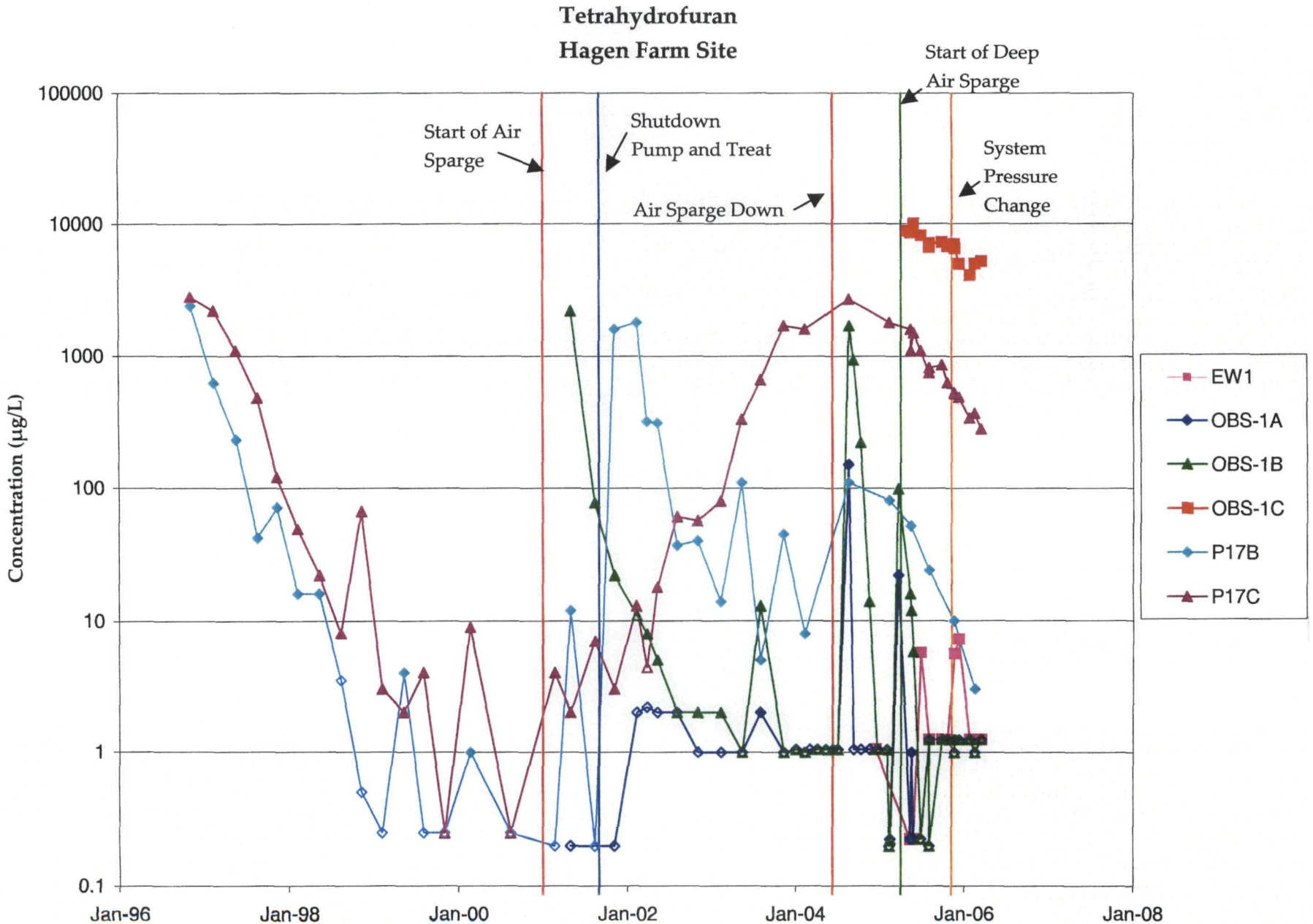

Hagen Farm, Town of Dunkirk, WI - Well ID: OBS2C
12/30/2004
12/30/2005
12/30/2006
10
1
0.1
Parameter Concentration (ppb)
857.40
857.20
857.00
856.80
856.60
856.40
856.20
856.00
855.80
855.60
855.40
Static Water Level Elevation (ft)
Benzene
THF
Vinyl Chloride
Total Xylenes
Static Water Level

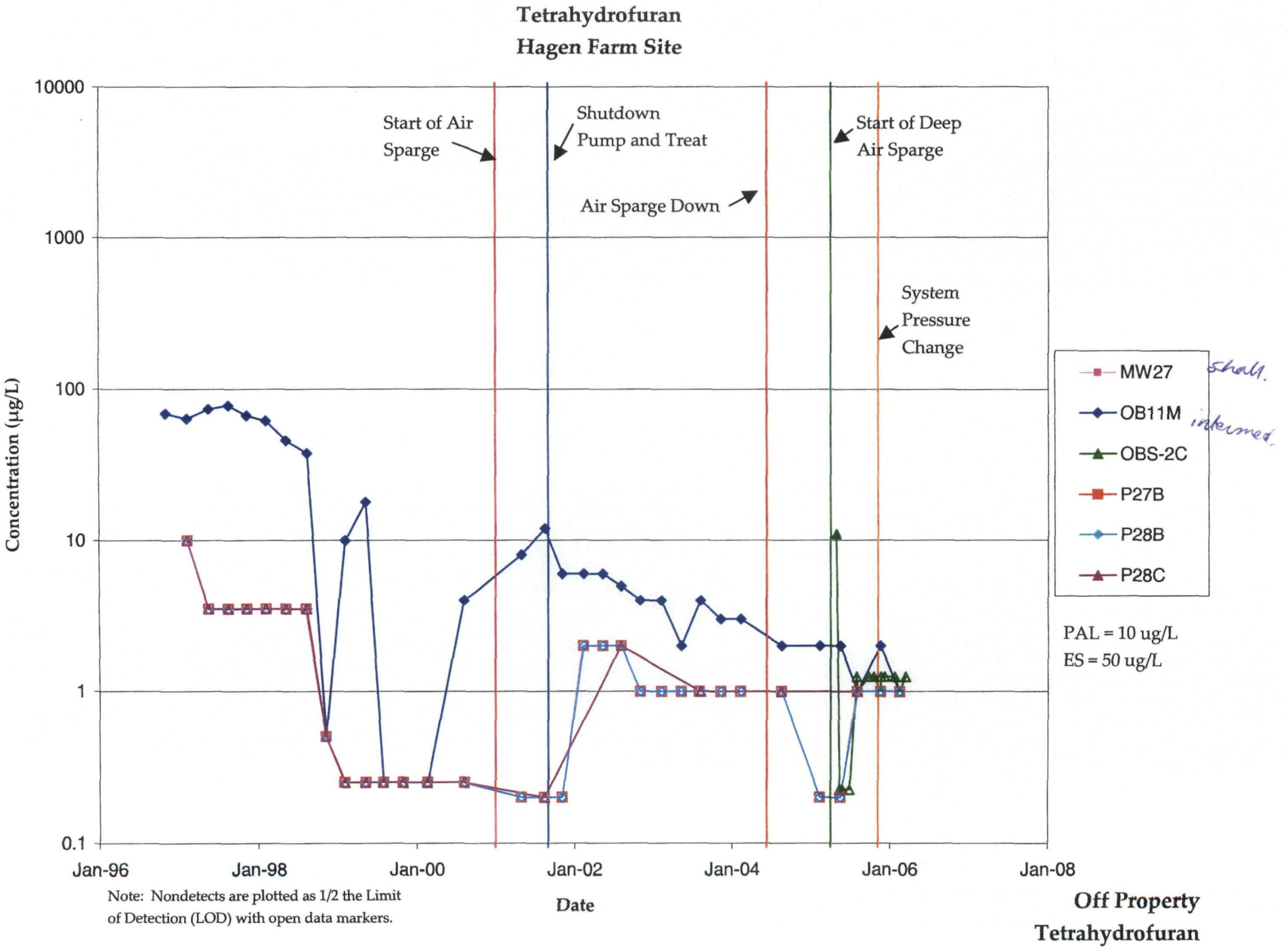

Hagen Farm, Town of Dunkirk, WI - Well ID: P17C
12/30/2004
12/30/2005
12/30/2006
10000
1000
100
10
1
0.1
Parameter Concentration (ppb)
856.80
856.60
856.40
856.20
856.00
855.80
855.60
855.40
Static Water Level Elevation (ft)
Benzene
THF
Vinyl Chloride
Total Xylenes
Static Water Level

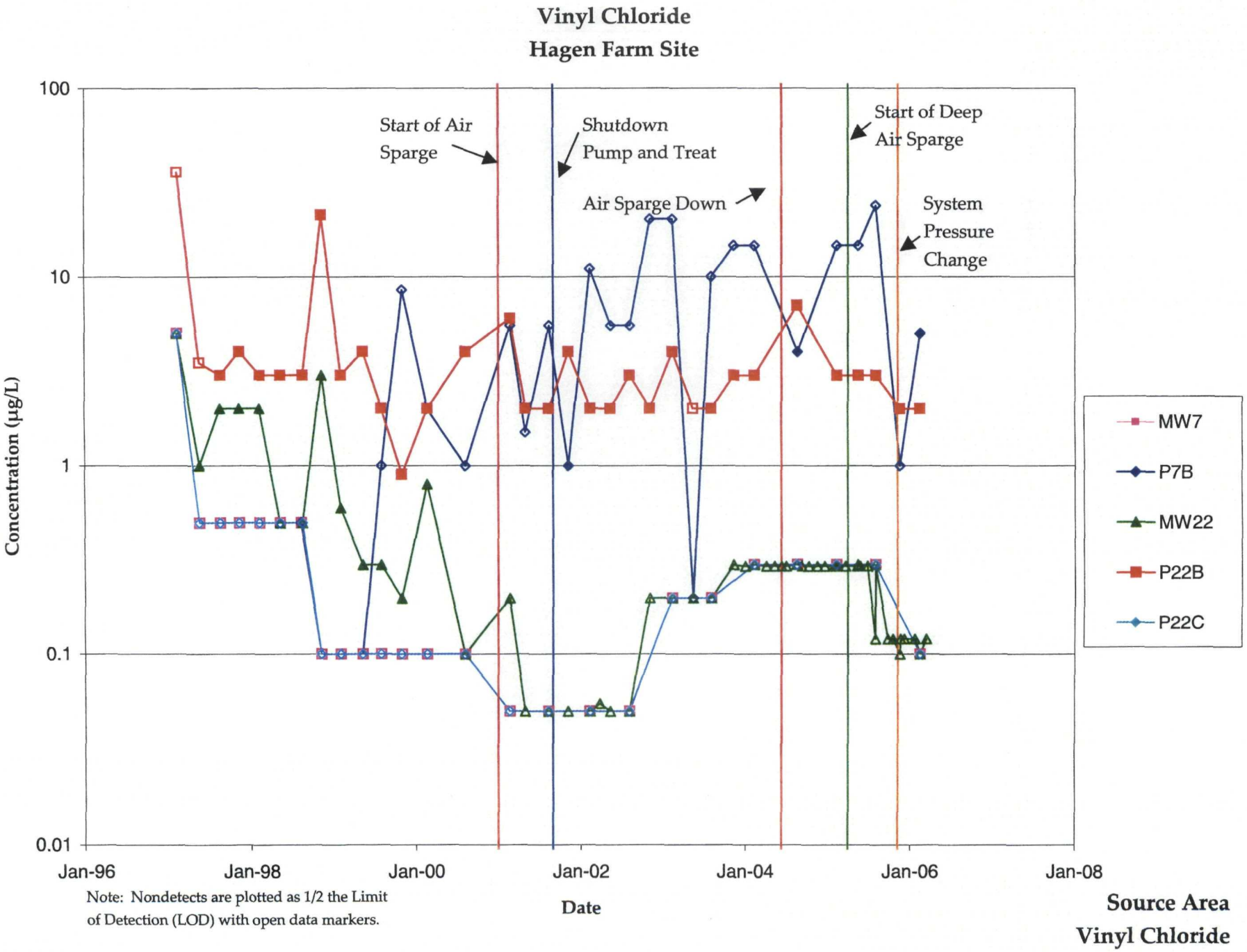


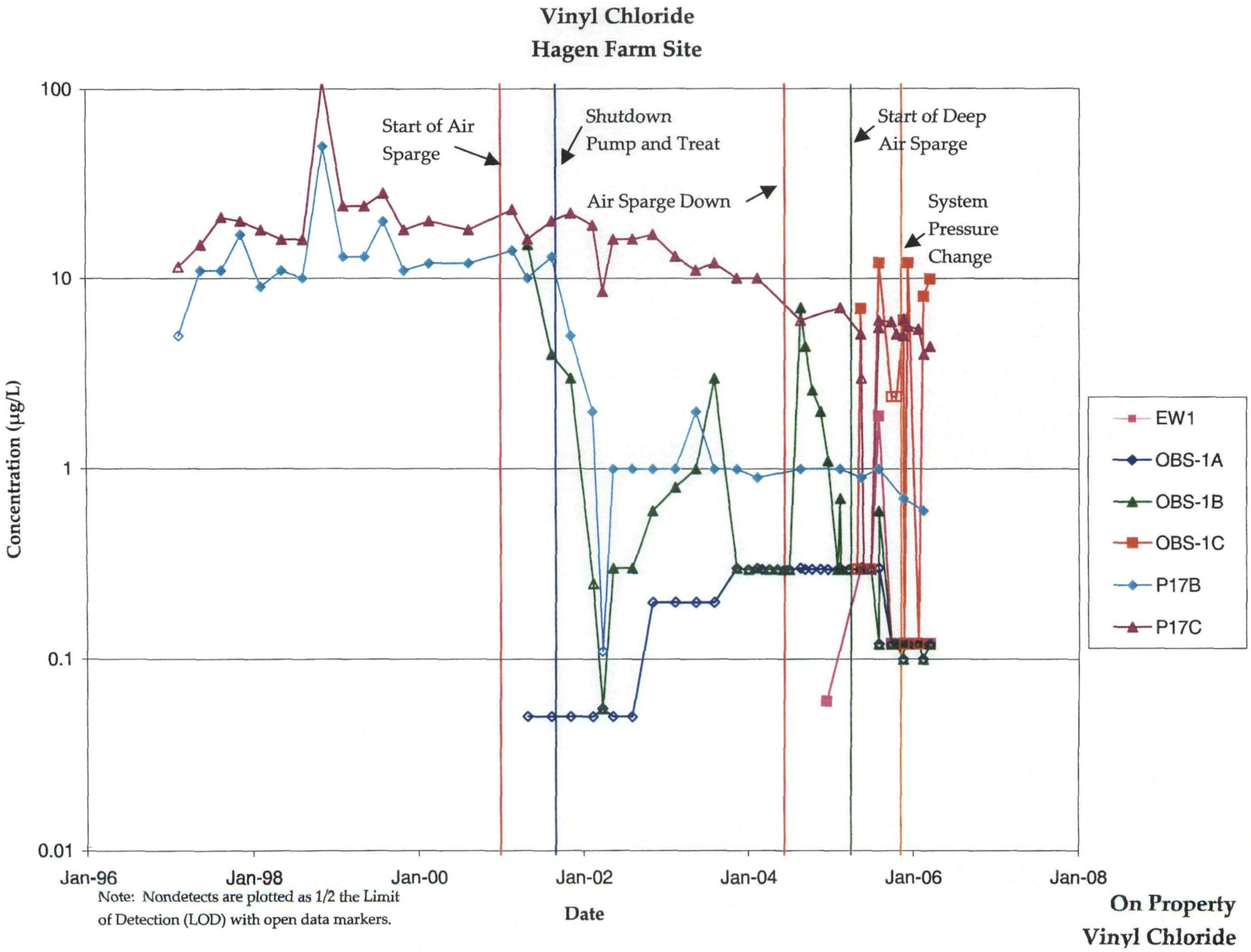
Note: Nondetects are plotted as 1/2 the Limit of Detection (LOD) with open data markers.

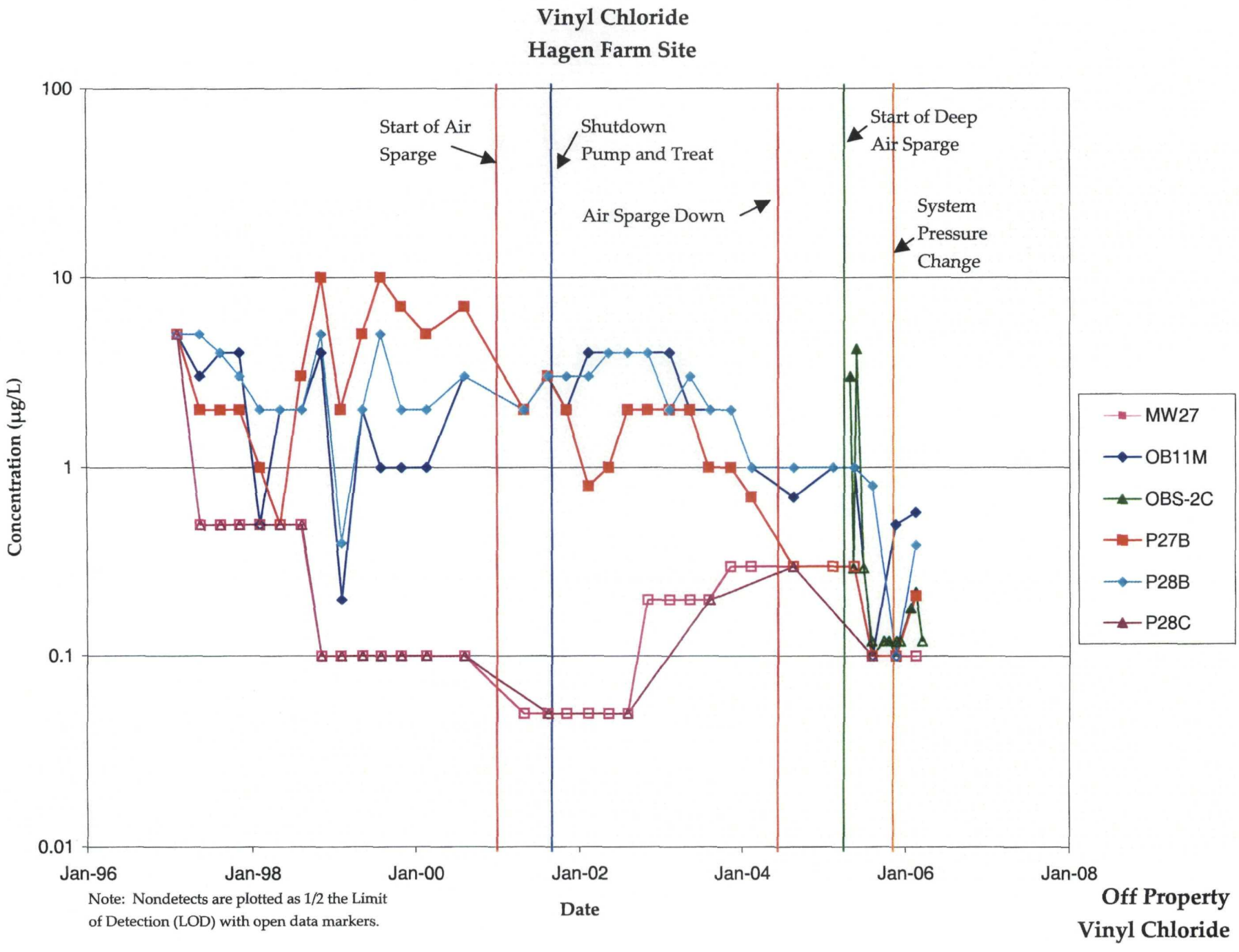
Source Area
Tetrahydrofuran


Tetrahydrofuran
Hagen Farm Site
Start of Deep Air Sparge
Start of Air Sparge
Shutdown Pump and Treat
System Pressure Change
Air Sparge Down
100000
10000
1000
100
10
1
0.1
Concentration (µg/L)
Jan-96
Jan-98
Jan-00
Jan-02
Jan-04
Jan-06
Jan-08
Date
EW1
OBS-1A
OBS-1B
OBS-1C
P17B
P17C
Note: Nondetects are plotted as 1/2 the Limit of Detection (LOD) with open data markers.
On Property Tetrahydrofuran


Tetrahydrofuran
Hagen Farm Site
10000
1000
100
10
1
0.1
Concentration (µg/L)
Start of Air Sparge
Shutdown Pump and Treat
Air Sparge Down
Start of Deep Air Sparge
System Pressure Change
MW27
OB11M
OBS-2C
P27B
P28B
P28C
PAL = 10 ug/L
ES = 50 ug/L
Jan-96
Jan-98
Jan-00
Jan-02
Jan-04
Jan-06
Jan-08
Date
Note: Nondetects are plotted as 1/2 the Limit of Detection (LOD) with open data markers.
Off Property
Tetrahydrofuran


Vinyl Chloride
Hagen Farm Site
100
10
1
0.1
0.01
Concentration (µg/L)
Start of Air Sparge
Shutdown Pump and Treat
Air Sparge Down
Start of Deep Air Sparge
System Pressure Change
Jan-96
Jan-98
Jan-00
Jan-02
Jan-04
Jan-06
Jan-08
Date
MW7
P7B
MW22
P22B
P22C
Note: Nondetects are plotted as 1/2 the Limit of Detection (LOD) with open data markers.
Source Area
Vinyl Chloride


Vinyl Chloride
Hagen Farm Site
100
10
1
0.1
0.01
Concentration (µg/L)
Start of Air Sparge
Shutdown Pump and Treat
Air Sparge Down
Start of Deep Air Sparge
System Pressure Change
Jan-96
Jan-98
Jan-00
Jan-02
Jan-04
Jan-06
Jan-08
Date
EW1
OBS-1A
OBS-1B
OBS-1C
P17B
P17C
Note: Nondetects are plotted as 1/2 the Limit of Detection (LOD) with open data markers.
On Property Vinyl Chloride


Vinyl Chloride
Hagen Farm Site
100
10
1
0.1
0.01
Concentration (µg/L)
Start of Air Sparge
Shutdown Pump and Treat
Air Sparge Down
Start of Deep Air Sparge
System Pressure Change
Jan-96
Jan-98
Jan-00
Jan-02
Jan-04
Jan-06
Jan-08
Date
MW27
OB11M
OBS-2C
P27B
P28B
P28C
Note: Nondetects are plotted as 1/2 the Limit of Detection (LOD) with open data markers.
Off Property
Vinyl Chloride

Attachment 3 – VOC and DO Groundwater Summary Tables From the March 30, 2006 Low Flow Air Sparging Report

Table 1
Summary of VOC Detections
Hagen Farm Site
Town of Dunkirk, Wisconsin

PARAMETER	UNITS	PAL	ES	DATE	WELLS																																			
					EW1	IG-04	MW1	MW22	MW23	MW26	MW27	MW29	MW30	MW32	MW33	MW7	OB11M	OB8M	OBS-1A	OBS-1B	OBS-1C	OBS-2C	P17B	P17C	P17DR	P22B	P22C	P26B	P26C	P27B	P28B	P28C	P29B	P29C	P30B	P30C	P32B	P33B	P35B	P40D	P7B
1,2-Dichloroethane	L	0.5	5	Aug-01								<0.1		<0.1			0.3	<0.1												<0.1	<0.1	<0.1	<0.1			<0.1		<0.1		
				Nov-01						<0.1	<0.1						0.2	<0.1					<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1						<0.1				
				Feb-02		<0.1		<0.1	<0.1								0.2	<0.1	<0.1	<0.6						<1	<0.1				<0.1						<0.1				
				Aug-02		<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1		<0.1	0.2	<0.1					<0.1	0.2	<0.1					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<13
1,2-Dichloropropane	L	0.5	5	Feb-99			<0.2						<0.2	<0.2			<0.2	<0.2					0.3	<0.2	<0.2						<0.2	<0.2			<0.2	<0.2	<0.2		<0.2		
				May-99			<0.2	<0.2		<0.2	<0.2		<0.2		<0.2	<0.2	<0.2						0.2	<0.2	<0.2	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2			<0.2	<0.2		<0.2		<0.2	<0.2
				Feb-00		<0.2		<0.2	<0.2	<0.2		<0.2	<0.2				<0.2						0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2					
				Feb-01		<0.1		<0.5	<0.1	<0.1					<0.1	<0.1							0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								<0.1		<0.1	<14
2-Hexanone	L			Feb-99			<1					<1	<1				<1	1					<1	<1	<1						<1	<1			<1	<1	<1		<1		
				Nov-01				<0.4											<0.4	<0.4						2															<0.4
4-Methyl-2-Pentanone	L	50	500	Nov-96			<0	<0							<0	<0										78	<0						<0				<0			<0
(MIBK)				Feb-97			<10	<10	<10		<10	<10		<10	<10	<10	<10									320	<10			<10	<10	<10	<10	<10	<10	<10	<10	<10			<10
				May-97			<10	<10		<10	<10	<10	<10	<10	<10	<10	<10	<10					<10	<14	<10	120	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
				Aug-01			2	<2	<2							<2										<16	<2														<160
Acetone	L	200	1,000	Nov-96			<0	<0							<0	<0										180	<0						<0				<0			<0
				May-97			<10	<10		<10	<10	<10	<10	<10	<10	<10	<10	<10					<10	<14	<10	1,800	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
				Feb-99							4				<1	5														<1							<1			<1
				Aug-99			<1			3					<1													<1	<1							<1				
				Feb-00		<1		<1	<1	<1		<1	<1				<1						<1	<1	<1	2	<1	<1	<1		<1	<1	<1	<1	<1	<1					
				Aug-01		6	7	<3	<3	4		<3		4	<3	<3	<3	<3	<3	<13						<27	<3	<3	<3		<3	<3	<3	<3			7	<3	<3	<3	<270
				Nov-01				<3		3	<3						3	3	3	6			3	4	<3	5		3	<3	3	<3						<3				<3
				May-02				<3		<3	<3						<3	<3	<3	3			<5	<3	<3	<3		<3	<3	<3	<3						<3				<270
				Aug-02		<3	<3		<3		<3	<3	<3	<3		<3	<3	<3					<3	<3	<3					<3	<3	<3	<3	4	<3	<3	3		<3	<3	<270
				Aug-03			<3	<3	<3		<3				<3	<3	6	<3	<3	3			3	4	<3	<7	<3			<3	6	<3						<3	<3		<170
				Nov-03				<2		<2	<2						<2	<2	<2	3			2	<23	<2	<12		<2	<2	2	<2						<2				<120
				Feb-04		<2		<2	<2	<2	<2				<2	3	<2	<2	<2	3			2	<9	<2	<5	<2	<2	<2	<2	<2						2	<2		<2	<120
				Aug-04		<2				<2				<2		<2		<2	3	6			<2	<46	<2			<2	<2							5		<2	<2	<2
				Feb-05		2		<2	2	<2	<2				<2	2	<2	<2	<2	2			<2	<23	<2	<5	<2	<2	<2	<2	<2						<2	<2		<2	<120
				Aug-05			<2		<2			<2	<2	3 J			<2	<2				<2								<2	<2	<2	<2	<2	<2	<2		<2		
				Feb-06		<2		3 J	2 J	<2	<2				<2	<2	2 J	<2	<2	<2	<2	2 J	<2	<2	<2	3 J	<2	<2	<2	<2	<2						<2	2 J		<2	<2
Benzene	L	0.5	5	May-97			<1	1		<1	<1	<1	<1	<1	<1	<1	<1	<1					2	3	<1	8	<1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
				Aug-97				1		<1					<1	<1	<1						1	3	<1	3	<1	2	<1		<1	<1					<1		<1	<1	
				Nov-97			<1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1					2	3	<1	3	<1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
				Feb-98			<1	3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1					1	2	<1	2	<1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
				May-98		<1	<1	1	<1	2	<1	<1	<1	<1	<1	<1	<1	<1					2	2	<1	2	<1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
				Aug-98				<1		<1					<1								2	2	<1	2	<1	2	<1								<1		<1		
				Nov-98				4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	3					6	7	<0.2	13	<0.2	5	<0.2	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2
				Feb-99		<0.2	<0.2	0.9	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2					1	1	<0.2	2	<0.2	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2
				May-99			<0.2	0.7		<0.2	<0.2		<0.2		<0.2	<0.2	<0.2						2	1	<0.2	3	<0.2	1	<0.2	0.6	<0.2	<0.2			<0.2	<0.2		<0.2		<0.2	<0.2
				Aug-99		<0.2	<0.2	0.6	<0.2	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2					2	1	0.2	2	<0.2	1	0.2	2	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	<0.2	<2

Table 1 *(continued)*
Summary of VOC Detections
Hagen Farm Site
Town of Dunkirk, Wisconsin

PARAMETER	UNITS	PAL	ES	DATE	WELLS																																						
					EW1	IG-04	MW1	MW22	MW23	MW26	MW27	MW29	MW30	MW32	MW33	MW7	OB11M	OB8M	OBS-1A	OBS-1B	OBS-1C	OBS-2C	P17B	P17C	P17DR	P22B	P22C	P26B	P26C	P27B	P28B	P28C	P29B	P29C	P30B	P30C	P32B	P33B	P35B	P40D	P7B
Benzene	L	0.5	5	Nov-99		<0.2	<0.2	0.6	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2					1	1	<0.2	1	<0.2	1	<0.2	2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.3	<0.2	<13
(continued)				Feb-00		<0.2		1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2					2	1	<0.2	2	<0.2	1	<0.2	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<3
				Aug-00		<0.2		0.7	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	0.2	0.2					1	1	<0.2	2	<0.2	1	<0.2	0.8	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		0.4	<0.2	<2
				Feb-01		<0.2		<0.6	<0.2	<0.2					<0.2	<0.2							2	2	<0.2	4	<0.2	1	<0.2								<0.2			<0.2	<16
				May-01				<0.2		<0.2	<0.2						<0.2	<0.2	<0.2	<3			1	1	<0.2	2		0.8	<0.2	<0.2	0.3					<0.2				<4
				Aug-01		0.3	<0.2	<0.2	0.2	0.5	<0.2	<0.2	<0.2	<0.2	<0.2	0.7	0.3	<0.2	<0.2	<0.8			1	2	<0.2	2	0.2	1	<0.2	0.7	0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<16
				Nov-01				<0.2		<0.2	<0.2						<0.2	0.4	<0.2	0.6			2	2	<0.2	2		0.8	<0.2	0.4	0.3					<0.2				0.6
				Feb-02		<0.2		<0.2	<0.2	<0.2	<0.2				<0.2	<0.2	<0.2	<0.2	<0.2	<0.8			1	2	<0.2	<2	<0.2	0.8	<0.2	<0.2	0.5					<0.2	<0.2		<0.2	<32
				Mar-02	<0.32			<0.16											<0.16	<0.16			<0.32	2.4																	
				May-02				<0.2		<0.2	<0.2						<0.2	<0.2	<0.2	0.3			1	2	<0.2	2		0.7	<0.2	<0.2	0.4					<0.2				<16
				Aug-02		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.4	<0.2	<0.2	<0.2			1	3	<0.2	2	<0.2	0.9	<0.2	<0.2	0.7	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	<0.2	<16
				Nov-02				<0.4		<0.4	<0.4						<0.4	<0.4	<0.4	<0.4			1	3	<0.4	2		0.7	<0.4	<0.4	0.4					<0.4				<40
				Feb-03				<0.4		<0.4					<0.4	<0.4			<0.4	<0.4			1	2	<0.4	2	0.5	0.7	<0.4									<0.4		<0.4	<40
				May-03				<0.4		<0.4									<0.4	<0.4			2	3	<0.4	<4		0.8	<0.4												<0.4
				Aug-03		0.3	<0.4	<0.4	<0.4	<0.3	<0.4	<0.3	<0.3		<0.4	<0.4	1	<0.4	<0.4	0.6			1	3	<0.4	2	<0.4	0.7	<0.3	0.4	<0.4	<0.4	<0.3	<0.3	<0.3	<0.3		<0.4	<0.4	<0.3	<20
				Nov-03				<0.3		<0.3	<0.3						<0.3	0.8	<0.3	<0.3			1	3	<0.3	2		0.6	<0.3	0.4	<0.3					<0.3				<14
				Feb-04		<0.3		<0.3	<0.3	<0.3	<0.3				<0.3	<0.3	<0.3	<0.3	<0.3	<0.3			1	4	<0.3	2	<0.3	0.5	<0.3	<0.3	<0.3					<0.3	<0.3		<0.3	<14
				Aug-04		<0.3		<0.3	<0.3	<0.3			<0.3	<0.3	<0.3	<0.3		<0.3	<0.3	2			0.9	<6	<0.3	2	0.7	0.5	<0.3					<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	1
				Sep-04				<0.28											<0.28	1.2																					
				Feb-05		<0.3		<0.3	<0.3	<0.3	<0.3				<0.3	<0.3	<0.3	<0.3	<0.3	0.5			1	4	<0.3	2	<0.3	0.5	<0.3	<0.3	<0.3					<0.3	<0.3		<0.3	<14
				May-05[1]	<0.28			<0.28											<0.28	<0.28	<0.28	<0.28		3.5																	
				May-05[2]				0.4		<0.3	<0.3						<0.3	<0.3	<0.3	<0.3			0.9	3	<0.3	2		0.6	<0.3	<0.3	0.3					<0.3				<14
				Jun-05	<0.28			1											<0.28	<0.28	<0.28	<0.28		<0.28																	
				Aug-05[4]	<0.35			<0.35											<0.35	<0.35	5	<0.35		3.3																	
				Aug-05[5]		<0.3	<0.4	1	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.4 J	<0.4	<0.4	<0.3	<0.3	<11	<0.4	0.9 J	4 J	<0.3	2	<0.3	0.5 J	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<23
				Sep-05	<0.35			1.1											<0.35	<0.35	<7	<0.35		3.4																	
				Oct-05	<0.35			1.4											<0.35	<0.35	<7	<0.35		<1.4																	
				Nov-05[6]				1		<0.4								<0.4					0.6 J	3	<0.4	2		<0.4	<0.4								<0.4				<4
				Nov-05[7]	<0.35			1.2											<0.35	<0.35	<0.35	<0.35		<0.35																	
				Dec-05	<0.35			<0.35											<0.35	<0.35	4	<0.35		3.3																	
				Jan-06	<0.35			<0.35											<0.35	<0.35	<0.35	<0.35		2.9																	
				Feb-06	<0.35	<0.4		<0.4	<0.4	<0.4	<0.4				<0.4	<0.4	<0.4	<0.4	<0.4	4	<0.4	0.6 J	3	<0.4	1 J	<0.4	<0.4	<0.4	<0.4	<0.4					<0.4	<0.4		<0.4	1 J
				Mar-06	<0.35			<0.35											<0.35	<0.35	4	<0.35		3.1																	
Bromochloromethane	L			Feb-00		<0.2		<0.2	<0.2	<0.2		<0.2	<0.2				<0.2						<0.2	<0.2	<0.2	0.5	0.2	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2					
Bromomethane	L	1	10	Aug-02		<0.07	<0.07		<0.07		<0.07	<0.07	<0.07	0.2		<0.07	<0.07	<0.07					<0.07	<0.07	<0.07					<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07		<0.07	<0.07	<7
				Aug-05			0.6 J		<0.3			0.6 J	<0.3	<0.3			<0.3	<0.3				<0.3								<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3		<0.3			
Carbon disulfide	L	200	1,000	May-01				<0.2		<0.2	<0.2						<0.2	<0.2	<0.2	<3			<0.2	<0.2	<0.2	4		<0.2	<0.2	<0.2	<0.2					<0.2				<4
				Aug-05		0.2 J		<0.2								<0.2			<0.2	<0.2	<8		<0.2	<2	<0.2	<0.2	<0.2													<16

Table 1 *(continued)*
Summary of VOC Detections
Hagen Farm Site
Town of Dunkirk, Wisconsin

					WELLS																																		
PARAMETER	UNITS	PAL	ES	DATE	FW1	IG-04	MW1	MW22	MW23	MW26	MW27	MW29	MW30	MW32	MW33	MW7	OB11M	OB8M	OBS-1A	OBS-1B	OBS-1C	OBS-2C	P17B	P17C	P17DR	P22B	P22C	P26B	P26C	P27B	P28B	P28C	P29B	P29C	P30B	P30C	P32B	P33B	P35B	P40D	P7B
Chlorobenzene	L			Nov-98				<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	2	<0.2					<0.2	<0.2	<0.2	3	<0.2	<0.2	<0.2	6	2	<0.2	<0.2	<0.2	<0.2	<0.2	3		<0.2	<0.2	<0.2
				Feb-99		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2					0.2	<0.2	<0.2	0.6	<0.2	0.3	<0.2	0.6	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.9	<0.2	<0.2	<0.2	<0.2
				May-99		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.7	<0.2					<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	0.8	2	<0.2	<0.2	<0.2	<0.2	<0.2	0.8	<0.2	<0.2	<0.2	<0.2
				Aug-99				<0.2	<0.2		<0.2	<0.2	<0.2			<0.2	0.5									<2	<0.2			1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2					<2
				Nov-99		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.6	<0.2					0.2	<0.2	<0.2	<0.4	<0.2	<0.2	<0.2	1	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.6	<0.2	<0.2	<0.2	<15
				Feb-00		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.6	<0.2					<0.2	<0.2	<0.2	0.4	<0.2	0.2	<0.2	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.5	<0.2	<0.2	<0.2	<4
				Aug-00		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		<0.2		<0.2	0.7	<0.2								0.5	<0.2	0.2	<0.2	1	0.3	<0.2	<0.2	<0.2			0.7		<0.2	<0.2	<2
				Feb-01		<0.2		<0.6	<0.2	<0.2					<0.2	<0.2							0.2	0.3	<0.2	0.8	<0.2	0.3	<0.2									<0.2		<0.2	<15
				May-01				<0.2		<0.2	<0.2						0.7	<0.2	<0.2	<3			0.2	0.3	<0.2	<0.8		0.2	<0.2	0.8	0.2						0.6				<4
				Aug-01						<0.2	<0.2	<0.2	<0.2	<0.2			0.8	<0.2					<0.2	0.2	<0.2					0.9	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.6		<0.2		
				Nov-01				<0.2		<0.2	<0.2						0.4	<0.2	<0.2	<0.2			0.2	0.3	<0.2	0.4		<0.2	<0.2	0.7	<0.2						0.5				<0.2
				Feb-02		<0.2		<0.2	<0.2	<0.2	<0.2				<0.2	<0.2	0.8	<0.2	<0.2	<0.8			0.3	0.3	<0.2	<2	<0.2	0.2	<0.2	0.7	0.3						0.5	<0.2		<0.2	<30
				May-02				<0.2		<0.2	<0.2						0.8	<0.2	<0.2	<0.2			<0.3	0.3	<0.2	0.2		<0.2	<0.2	0.7	0.3						0.4				<15
				Aug-02		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	1	<0.2	<0.2	<0.2			0.4	0.5	<0.2	0.2	<0.2	<0.2	<0.2	1	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	0.4	<0.2	<0.2	<0.2	<15
				Nov-02				<0.4		<0.4	<0.4						0.9	<0.4	<0.4	<0.4			0.4	0.5	<0.4	<0.4		<0.4	<0.4	0.7	<0.4						<0.4				<39
				Feb-03		<0.4			<0.4		<0.4						0.9	<0.4												0.7	<0.4						<0.4				
				May-03				<0.4		<0.4	<0.4						0.7	<0.4	<0.4	<0.4			0.6	0.5	<0.4	<4		<0.4	<0.4	<0.4	<0.4						<0.4				<0.4
				Aug-03			<0.4	<0.4	<0.4		<0.4				<0.4	<0.4	0.8	<0.4	<0.4	<0.4			<0.4	0.5	<0.4	<0.8	<0.4			0.5	<0.4	<0.4	<0.4					<0.4	<0.4		<19
				Nov-03							<0.2						0.6	<0.2	<0.2	<0.2										<0.2	<0.2						<0.2				<10
				Feb-04						<0.2							0.6	<0.2										<0.2	<0.2		<0.2						<0.2			<0.2	
				Aug-04							<0.2	<0.2					0.7													<0.2	<0.2	<0.2	<0.2	<0.2			<0.2				
				Feb-05		<0.2				<0.2	<0.2						0.8	<0.2	<0.2	<0.2			0.3	<2	<0.2			<0.2	<0.2	0.4	<0.2						<0.2			<0.2	
				May-05[7]				<0.2		<0.2	<0.2						0.7	<0.2	<0.2	<0.2			0.2	<2	<0.2	0.2		<0.2	<0.2	0.4	<0.2						<0.2				<10
				Aug-05		<0.2		<0.2								<0.2			<0.2	<0.2	<8		0.2 J	<2	<0.2	<0.2	<0.2													<17
				Nov-05							<0.3						0.6 J		<0.3	<0.3	<16	<0.3								0.4 J	<0.3										
Chloroethane	L	80	400	Nov-01				<0.1											<0.1	<0.1						0.3														<0.1
Chloroform	L	0.6	6	Feb-99		<0.2		<0.2	<0.2	<0.2		<0.2														<0.2	<0.2	0.4	<0.2				<0.2	<0.2						<0.2	
Chloromethane	L	0.3	3	Feb-99		0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2			<0.2	0.2					<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	
				Aug-00						<0.2	<0.2	<0.2		0.5			<0.2	2										<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2			<0.2		<0.2	<0.2	
				Aug-01		<0.06				0.2	2		0.2		<0.06				0.3	<0.3			<0.06	0.7	<0.06			0.2	<0.06	0.3					<0.06	<0.06		<0.06		<0.06	
				Nov-01				<0.06											<0.06	0.06						0.2														0.3
				Aug-02		0.4	0.2	0.2	0.2	<0.06	0.4	<0.06	<0.06	9	<0.06	0.4	0.3	0.2	<0.06	0.4			0.3	0.4	<0.06	<0.06	<0.06	0.4	<0.06	0.3	3	1	<0.06	<0.06	0.9	<0.06	0.7	<0.06	1	0.5	<6
cis-1,2-Dichloroethene	L	7	70	Nov-98				<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2					<0.2	11	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	1
				Feb-99		<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2			<0.2	<0.2					0.3	2	<0.2	<0.2	<0.2	0.4	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	
				May-99			<0.2	<0.2		<0.2	<0.2		<0.2		<0.2	<0.2	0.6						0.4	2	<0.2	<1	<0.2	0.3	<0.2	0.2	0.3	<0.2			<0.2	<0.2		<0.2		<0.2	<0.2
				Aug-99		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	<0.2					0.4	1	<0.2	<1	<0.2	0.2	<0.2	<0.2	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2
				Nov-99		<0.2				<0.2		<0.2		<0.2	<0.2	<0.2	0.3	<0.2					<0.2	1	<0.2			<0.2	<0.2		<0.2	<0.2	<0.2	<0.2			<0.2	<0.2	<0.2	<0.2	<13
				Feb-00		<0.2		<0.2	<0.2	<0.2		<0.2	<0.2				0.4						0.2	1	<0.2	<0.2	<0.2	0.3	<0.2		0.2	<0.2	<0.2	<0.2	<0.2	<0.2					
				Aug-00						<0.2	<0.2	<0.2	<0.2	<0.2			0.3	<0.2					<0.2	0.5	<0.2			0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	
				Feb-01		<0.1		<0.6	<0.1	<0.1					<0.1	<0.1							0.2	0.6	<0.1	0.3	<0.1	0.3	<0.1								<0.1		<0.1	<15

Table 1 *(continued)*
Summary of VOC Detections
Hagen Farm Site
Town of Dunkirk, Wisconsin

PARAMETER	UNITS	PAL	ES	DATE	WELLS																																		
					SW1	IG-04	MW1	MW22	MW23	MW26	MW27	MW29	MW30	MW32	MW33	MW7	OB11M	OB8M	OBS-1A	OBS-1B	OBS-1C	OBS-2C	P17B	P17C	P17DR	P22B	P22C	P26B	P26C	P27B	P28B	P28C	P29B	P29C	P30B	P30C	P32B	P33B	P35B	P40D	P7B
cis-1,2-Dichloroethene	L	7	70	May-01				<0.1		<0.1	<0.1						0.5	<0.1	<0.1	<3			0.2	0.4	<0.1	<0.7		0.3	<0.1	<0.1	0.4						<0.1				<4
(continued)				Aug-01		<0.1				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		0.6	0.2	<0.1	<0.7			0.3	0.5	<0.1			0.4	<0.1	0.3	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
				Nov-01				<0.1		<0.1	<0.1						0.4	<0.1	<0.1	<0.1			<0.1	0.3	<0.1	0.2		0.4	<0.1	0.2	0.4						<0.1				1
				Feb-02		<0.1		<0.1	<0.1	<0.1	<0.1				<0.1	<0.1	0.6	<0.1	<0.1	<0.7			<0.1	0.2	<0.1	<1	<0.1	0.4	<0.1	<0.1	0.5						<0.1	<0.1		<0.1	<29
				May-02				<0.1		<0.1	<0.1						0.4	<0.1	<0.1	<0.1			<0.3	<0.1	<0.1	<0.1		0.2	<0.1	<0.1	0.4						<0.1				<15
				Aug-02		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.5	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	0.3	<0.1	0.4	<0.1	0.3	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<15
				Nov-02				<0.3		<0.3	<0.3						0.4	<0.3	<0.3	<0.3			<0.3	<0.3	<0.3	0.3		<0.3	<0.3	<0.3	0.4						<0.3				<28
				Feb-03		<0.3		<0.3	<0.3	<0.3	<0.3				<0.3	<0.3	0.6	<0.3	<0.3	<0.3			<0.3	<1	<0.3	<0.6	<0.3	0.3	<0.3	0.3	0.4						<0.3	<0.3		<0.3	<28
				May-03				<0.3		<0.3	<0.3						0.3	<0.3	<0.3	<0.3			<0.3	<0.3	<0.3	<3		0.4	<0.3	<0.3	0.3						<0.3				<0.3
				Aug-03			<0.3	<0.3	<0.3		<0.3				<0.3	<0.3	0.5	0.3	<0.3	<0.3			<0.3	<0.3	<0.3	<0.6	<0.3			0.4	0.3	<0.3					<0.3	<0.3		<14
				Nov-03				<0.3		<0.3	<0.3						<0.3	<0.3	<0.3	<0.3			<0.3	<3	<0.3	<2		0.3	<0.3	0.4	<0.3						<0.3				<16
				Feb-04		<0.3		<0.3	<0.3	<0.3	<0.3				<0.3	<0.3	<0.3	<0.3	<0.3	<0.3			<0.3	<1	<0.3	<0.6	<0.3	0.3	<0.3	0.4	<0.3						<0.3	<0.3		<0.3	<16
				Aug-04		<0.3				<0.3	<0.3	<0.3		<0.3		<0.3	<0.3	<0.3	<0.3	<0.3			<0.3	<6	<0.3			0.3	<0.3	0.8	<0.3	<0.3	<0.3	<0.3				<0.3		<0.3	<0.3	4
				Feb-05		<0.3				<0.3	<0.3						<0.3	<0.3	<0.3	<0.3			<0.3	<3	<0.3			0.4	<0.3	0.4	<0.3						<0.3			<0.3	
				May-05[2]				<0.3		<0.3													<0.3	<3	<0.3	0.4		0.4	<0.3												<16
				Aug-05		<0.3	<0.4	<0.3	<0.4			<0.4	<0.4	<0.4		<0.3	<0.4	<0.4	<0.3	<0.3	<13	2	<0.3	<2	<0.3	0.3 J	<0.3				<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4		<0.4		<26
				Nov-05				<0.4		<0.4	<0.4						<0.4	<0.4	<0.4	<0.4	<18	1	<0.4	<1	<0.4	<0.4		<0.4	<0.4	<0.4	<0.4						<0.4				6 J
				Feb-06		<0.4		<0.4	<0.4	<0.4	<0.4				<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	1 J	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4						<0.4	<0.4		<0.4	2
Dichlorodifluoromethane	L	200	1,000	May-05[2]				<0.5		<0.5													<0.5	<5	<0.5	0.7		<0.5	<0.5												<24
Dichloromethane	L	0.5	5	Nov-98				<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2					<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	2
				Feb-99							0.8				<0.2	<0.2														<0.2							<0.2			<0.2
				Aug-00		<0.2		<0.2	<0.2							<0.2										<0.2	<0.2													2
				Feb-01		<0.3		<1	<0.3	<0.3					<0.3	<0.3							<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3								<0.3		<0.3	40
				Aug-01		<0.3	<0.3	<0.3	<0.3	<0.3					<0.3	<0.3			<0.3	2						5	<0.3	<0.3	<0.3								<0.3		<0.3	62
				Nov-01				<0.3											<0.3	<0.3						<0.3														1
				Feb-02		<0.3		<0.3	<0.3								<0.3	<0.3	<0.3	2						4	<0.3				<0.3						<0.3				
				Aug-02		<0.3	<0.3		<0.3		<0.3	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3					<0.3	<0.3	<0.3					<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3		<0.3	<0.3	53
				Nov-03				<0.4		<0.4													<0.4	4	<0.4	2		<0.4	<0.4												
				Aug-04		<0.4		<0.4	<0.4	<0.4			<0.4	<0.4	<0.4	<0.4		<0.4	<0.4	<0.4			<0.4	<8	<0.4	4	<0.4	<0.4	<0.4					<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.5
				Aug-05		<0.4		<0.4								<0.4			<0.4	<0.4	21 J		<0.4	<3	<0.4	<0.4	<0.4													44 J
				Nov-05							<0.4						<0.4		<0.4	<0.4	24 J	<0.4							<0.4	<0.4										
Ethylbenzene	L	140	700	Nov-96			<0	<0							<0	<0										610	<0						<0				<0			<0
				Feb-97			<10	<10	<10		<10	<10		<10	<10	<10	<10									870	<10			<10	<10	<10	<10	<10	<10	<10	<10	<10			<10
				May-97			<10	<10		<10	<10	<10	<10	<10	<10	<10	<10	<10					<10	<14	<10	810	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
				Aug-97				<10		<10					<10	<10	<10						<10	<10	<10	510	<10	<10	<10		<10	<10					<10		<10	<10	<10
				Nov-97			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10					<10	<10	<10	390	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
				Feb-98			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10					<10	<10	<10	340	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
				May-98			<10	<10	<10	<10	<10	<10	<10	<10		<10	<10	<10								330	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		<10	<10	<10
				Aug-98				<10							<10											320	<10										<10				
				Nov-98				1	<0.2	<0.2	3	<0.2	<0.2	<0.2		<0.2	<0.2	2					57	<0.2	<0.2	1,500	<0.2	5	4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2

Table 1 *(continued)*
Summary of VOC Detections
Hagen Farm Site
Town of Dunkirk, Wisconsin

PARAMETER	UNITS	PAL	ES	DATE	WELLS																																			
					EW1	IG-04	MW1	MW22	MW23	MW26	MW27	MW29	MW30	MW32	MW33	MW7	OB11M	OB8M	OBS-1A	OBS-1B	OBS-1C	OBS-2C	P17B	P17C	P17DR	P22B	P22C	P26B	P26C	P27B	P28B	P28C	P29B	P29C	P30B	P30C	P32B	P33B	P35B	P40D	P7B
Ethylbenzene	L	140	700	Feb-99		<0.2		0.2	<0.2	<0.2	<0.2	<0.2			0.2	<0.2										140	<0.2	<0.2	<0.2	0.3			<0.2	<0.2				<0.2		<0.2	<0.2
(continued)				May-99			<0.2	<0.2		<0.2	<0.2		<0.2		<0.2	<0.2	<0.2						<0.2	<0.2	<0.2	180	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2			<0.2	<0.2		<0.2		<0.2	<0.2
				Aug-99		<0.2		<0.2	<0.2		<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2					5	<0.2	<0.2	260	<0.2			<0.2	0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<2
				Nov-99			<0.2	<0.2	<0.2		<0.2		<0.2													60	<0.2			<0.2					<0.2	<0.2					
				Feb-00		<0.2		<0.2	<0.2	<0.2		<0.2	<0.2				<0.2						<0.2	<0.2	<0.2	5	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2					
				Aug-00		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2								8	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2			<0.2		0.3	<0.2	<2
				Feb-01		<0.1		<0.5	<0.1	<0.1					<0.1	<0.1							<0.1	<0.1	<0.1	39	<0.1	<0.1	<0.1								<0.1		<0.1	<13
				May-01				<0.1		<0.1	<0.1						0.2	<0.1	<0.1	120			<0.1	4	<0.1	50		<0.1	<0.1	<0.1	<0.1					<0.1				<3
				Aug-01		<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	<0.1			<0.1	28						12	<0.1	<0.1	<0.1								<0.1		<0.1	<13
				Nov-01				<0.1		<0.1	<0.1						<0.1	<0.1	<0.1	40			<0.1	11	<0.1	2		<0.1	<0.1	<0.1	<0.1					<0.1				<0.1
				Feb-02		<0.1		<0.1	<0.1								<0.1	<0.1	<0.1	13						<1	<0.1				<0.1					<0.1				
				Mar-02	<0.25			<0.13											<0.13	<0.13			<0.25	50																	
				May-02				<0.1		<0.1	<0.1						<0.1	<0.1	<0.1	0.9			<0.2	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1					<0.1				<13
				Aug-02		<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1					<0.1	<0.1	<0.1					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		0.6	<0.1	<13
				Nov-02				<0.4		<0.4	<0.4						<0.4	<0.4	<0.4	<0.4			<0.4	<0.4	<0.4	3		<0.4	<0.4	<0.4	<0.4					<0.4				<38
				Aug-03			<0.4	<0.4	<0.4		<0.4					<0.4			<0.4	0.5			<0.4	<0.4		<0.8	<0.4			<0.4										<19
				Feb-04		<0.3		<0.3	<0.3		<0.3				<0.3	<0.3			<0.3	<0.3			<0.3	<1	<0.3	0.6	<0.3			<0.3							<0.3				<16
				Aug-04		<0.3				<0.3				<0.3		<0.3		<0.3	<0.3	10			<0.3	570	<0.3			<0.3	<0.3								<0.3		<0.3	<0.3	<0.3
				Sep-04				<0.32											<0.32	6.2																				
				May-05[1]	<0.32			<0.32											<0.32	<0.32	25	<0.32		<0.32																
				Jun-05	<0.32			<0.32											<0.32	<0.32	53	<0.32		<0.32																
				Aug-05[4]	<0.32			<0.32											<0.32	<0.32	53	<0.32		<0.32																
				Aug-05[5]		<3		<3								<3			<3	<3	33 J		<3	<24	<3	<3	<3														<240
				Dec-05	<0.34			<0.34											<0.34	<0.34	10	<0.34		<0.34																
				Feb-06	<0.34	<0.3		<0.3	<0.3						<0.3	<0.3			<0.3	<0.3	6					<0.3	<0.3										<0.3				<0.3
m-Dichlorobenzene	L	125	1,250	Aug-99				0.3	<0.2		<0.2	<0.2	<0.2			<0.2	<0.2									<1	<0.2			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2					<2
Methyl ethyl ketone (MEK)	L	*90*	*460*	Nov-96			<0	<0							<0	<0										110	<0						<0				<0				<0
				May-97			<10	<10		<10	<10	<10	<10	<10	<10	<10	<10	<10					<10	<14	<10	3,800	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
				Nov-01				<0.4											<0.4	1						<0.4														<0.4
Naphthalene	L	8	40	Aug-99				<0.2	<0.2		<0.2	<0.2	<0.2			<0.2	0.3									<2	<0.2			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2					<2
				Feb-00		<0.2		<0.2	<0.2	<0.2		<0.2	<0.2				<0.2						<0.2	<0.2	<0.2	0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2					
				Aug-00						<1	<0.2	<0.2		<0.2			<1	<0.2										<0.2	<0.2	<0.2	<1	1	<0.2	<0.2			<0.2		<0.2	<0.2	
				Feb-01		<0.1		<0.6	<0.1	<0.1					<0.1	<0.1							<0.1	<0.1	<0.1	0.8	<0.1	<0.1	<0.1								<0.1		<0.1	<15
				Nov-01				<0.1											<0.1	<0.1						0.2														<0.1
				Dec-04				<0.44											<0.44	4.3																				
p-Dichlorobenzene	L	15	75	Nov-98				1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2					1	1	<0.2	7	<0.2	7	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2
				Feb-99		<0.2	<0.2	0.3	<0.2	<0.2		<0.2	<0.2	<0.2			<0.2	<0.2					0.2	0.2	<0.2	1	<0.2	2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	
				May-99			<0.2	0.4		<0.2	<0.2		<0.2		<0.2	<0.2	<0.2						0.2	0.2	<0.2	<1	<0.2	2	<0.2	<0.2	<0.2	<0.2			<0.2	<0.2		<0.2		<0.2	<0.2
				Aug-99			<0.2	0.3	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2									<1	<0.2	2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2			<2
				Nov-99			<0.2	0.3	<0.2	<0.2	<0.2		<0.2										<0.2	<0.2	<0.2	0.5	<0.2	1	<0.2	<0.2					<0.2	<0.2					

Table 1 *(continued)*
Summary of VOC Detections
Hagen Farm Site
Town of Dunkirk, Wisconsin

PARAMETER	UNITS	PAL	ES	DATE	WELLS																																				
					EW1	IG-04	MW1	MW22	MW23	MW26	MW27	MW29	MW30	MW32	MW33	MW7	OB11M	OB8M	OBS-1A	OBS-1B	OBS-1C	OBS-2C	P17B	P17C	P17DR	P22B	P22C	P26B	P26C	P27B	P28B	P28C	P29B	P29C	P30B	P30C	P32B	P33B	P35B	P40D	P7B
p-Dichlorobenzene	L	15	75	Feb-00		<0.2		0.3	<0.2	<0.2		<0.2	<0.2				<0.2						<0.2	<0.2	<0.2	0.6	<0.2	2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2					
(continued)				Aug-00		<0.2		0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2					<0.2	0.2	<0.2	0.7	<0.2	2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<2
				Feb-01		<0.2		<0.6	<0.2	<0.2					<0.2	<0.2							0.3	0.3	<0.2	1	<0.2	1	<0.2									<0.2		<0.2	<16
				May-01				<0.2		<0.2	<0.2						<0.2	<0.2	<0.2	<3			<0.2	<0.2	<0.2	<0.8		2	<0.2	<0.2	<0.2					<0.2					<4
				Aug-01		0.4	<0.2	0.3	<0.2	0.9	<0.2	<0.2	<0.2	<0.2	0.4	0.8	0.4	0.5	0.2	<0.8			0.3	0.4	<0.2	<2	<0.2	2	0.4	0.2	0.4	<0.2	0.4	0.6	<0.2	<0.2	0.3	0.2	0.3	0.4	<16
				Nov-01				<0.2		<0.2	<0.2						<0.2	<0.2	<0.2	<0.2			0.2	0.2	<0.2	0.6		1	<0.2	<0.2	<0.2					<0.2					<0.2
				Feb-02						<0.2	<0.2				<0.2	<0.2							0.2	0.3	<0.2			1	<0.2	0.2							<0.2		<0.2		<33
				May-02				<0.2		<0.2	<0.2						<0.2	<0.2	<0.2	<0.2			<0.3	0.2	<0.2	0.4		1	<0.2	<0.2	<0.2					<0.2					<16
				Aug-02		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2			0.2	0.3	<0.2	0.4	<0.2	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<16
				Nov-02				<0.3		<0.3	<0.3						<0.3	<0.3	<0.3	0.4			<0.3	0.3	<0.3	0.4		1	<0.3	<0.3	<0.3					<0.3					<33
				Feb-03				<0.3		<0.3					<0.3	<0.3			<0.3	0.3			<0.3	<1	<0.3	<0.6	<0.3	1	<0.3								<0.3		<0.3		<33
				May-03				<0.3		<0.3									<0.3	0.4			0.3	0.3	<0.3	<3		1	<0.3												<0.3
				Aug-03		<0.2	<0.3	<0.3	0.4	<0.2	<0.3	<0.2	<0.2			<0.3			<0.3	0.5			<0.3	0.3		<0.6	<0.3	1	<0.2	<0.3			<0.2	<0.2	<0.2	<0.2				<0.2	<16
				Nov-03				<0.2		<0.2	<0.2						<0.2	<0.2	<0.2	0.2			<0.2	<2	<0.2	<1		1	<0.2	<0.2	<0.2					<0.2					<12
				Feb-04		<0.2		<0.2	0.4	<0.2	<0.2				<0.2	<0.2	<0.2	<0.2	<0.2	<0.2			<0.2	<1	<0.2	<0.5	<0.2	1	<0.2	<0.2	<0.2					<0.2	<0.2		<0.2		<12
				Aug-04		<0.2				<0.2				<0.2		<0.2		<0.2	<0.2	0.7			<0.2	<5	<0.2			0.8	<0.2							<0.2		<0.2	<0.2	<0.2
				Feb-05		<0.2				<0.2	<0.2						<0.2	<0.2	<0.2	0.7			0.2	<2	<0.2			1	<0.2	<0.2	<0.2					<0.2			<0.2		
				May-05[2]				<0.2		<0.2	<0.2						<0.2	<0.2	<0.2	0.4			<0.2	<2	<0.2	0.3		0.9	<0.2	<0.2	<0.2					<0.2					<12
				Aug-05		<0.2		<0.2		<0.4	<0.4				<0.4	<0.2			<0.2	0.5 J	<10		<0.2	<2	<0.2	0.3 J	<0.2	1	<0.4	<0.4							<0.4		<0.4		<20
				Feb-06		<0.4		<0.4	0.6 J						<0.4	<0.4			<0.4	<0.4	0.9 J					<0.4	<0.4										<0.4				<0.4
Tetrachloroethylene	L	0.5	5	Nov-98				<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2					<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	49		<0.2	<0.2	<0.2
				Feb-99		0.2		<0.2	<0.2	<0.2		<0.2														<0.2	<0.2	2	<0.2				0.2	<0.2						<0.2	
				May-99		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.4	<0.2	<0.2	<0.2	0.4	<0.2	<0.2					<0.2	<0.2	<0.2	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.5	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
				Aug-01								<0.1		<0.1			<0.1	<0.1												<0.1	<0.1					<0.1		<0.1			
				Aug-04							<0.2	<0.2					<0.2												<0.2	<0.2	<0.2	0.3	<0.2								
Tetrahydrofuran	L	10	50	Nov-96			<0	5800	<0	<0	<0	<0	<0	<0	<0	<0	69	<0					2,400	2,800	<0	3,500	<0	<0	<0	<0	<0		<0	<0	<0	<0	23	<0	<0	<0	390
				Feb-97			<20	240	<20	<20	<20	<20	<20	<20	<20	<20	64	<20					620	2,200	<20	16000	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	20	<20	<20	<20	390
				May-97			<7	<7		<7	<7	<7	<7	<7	<7	<7	74	<7					230	1,100	<7	20000	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	17	<7	<7	<7	640
				Aug-97				9		<7	<7	<7	<7	<7	<7	<7	78	<7					42	480	<7	1,600	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	19	<7	<7	<7	920
				Nov-97			<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	67	<7					71	120	<7	540	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	13	<7	<7	<7	<7
				Feb-98			<7	290	<7	<7	<7	<7	<7	<7	<7	<7	62	<7					16	49	<7	380	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	11	<7	<7	<7	1,100
				May-98		<7	<7	61	<7	<7	<7	<7	<7	<7	<7	<7	46	<7					16	22	<7	1,200	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	12	<7	<7	<7	470
				Aug-98		<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	38	<7					<7	8	<7	1,300	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	11	<7	<7	<7	3,000
				Nov-98				<1	<1	<1	<1	<1	<1	<1		<1	<1	<1					<1	67	<1	18000	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	49,000
				Feb-99		<0.5	<0.5	32	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	10	<0.5					<0.5	3	<0.5	81	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	18
				May-99			<0.5	4		<0.5	<0.5		<0.5		<0.5	<0.5	18						4	2	<0.5	1,100	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	<0.5		<0.5		<0.5	600
				Aug-99		<0.5		2	<0.5		<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5					<0.5	4	<0.5	160	<0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	2,000
				Nov-99		<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5								53	<0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	11,000
				Feb-00		<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					1	9	<0.5	9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3,900
				Aug-00		<0.5		<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	4	<0.5								22	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5		<0.5	<0.5	10,000

Table 1 *(continued)*
Summary of VOC Detections
Hagen Farm Site
Town of Dunkirk, Wisconsin

					WELLS																																					
PARAMETER	UNITS	PAL	ES	DATE	LW1	IG-04	MW1	MW22	MW23	MW26	MW27	MW29	MW30	MW32	MW33	MW7	OB11M	OB8M	OBS-1A	OBS-1B	OBS-1C	OBS-2C	P17B	P17C	P17DR	P22B	P22C	P26B	P26C	P27B	P28B	P28C	P29B	P29C	P30B	P30C	P32B	P33B	P35B	P40D	P7B
Tetrahydrofuran	L	10	50	Feb-01		<0.4		490	<0.4	<0.4					<0.4	<0.4							<0.4	4	<0.4	1,700	<0.4	<0.4	<0.4									<0.4		<0.4	13,000
(continued)				May-01				<0.4		<0.4	<0.4						8	<0.4	<0.4	2,200			12	2	<0.4	980		<0.4	<0.4	<0.4	<0.4						2				3,700
				Aug-01		<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	12	<0.4	<0.4	78			<0.4	7	<0.4	1,300	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	5	<0.4	<0.4	<0.4	16,000
				Nov-01				<0.4		<0.4	<0.4						6	1	<0.4	22			1,600	3	<0.4	1,300		<0.4	<0.4	<0.4	<0.4						3				11,000
				Feb-02		<4		<4	<4	<4	<4				<4	<4	6	<4	<4	<22			1,800	13	<4	260	<4	<4	<4	<4	<4						<4	<4		<4	26,000
				Mar-02	92			<4.4											<4.4	8			320	<8.8																	
				May-02				14		<4	<4						6	<4	<4	5			310	18	<4	90		<4	<4	<4	<4						<4				11,000
				Aug-02		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	290	5	<4	<4	<4			37	61	<4	79	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	17,000
				Nov-02				<2		<2	<2						4	<2	<2	2			40	57	<2	1,100		<2	<2	<2	<2						<2				15,000
				Feb-03		<2		3	<2	<2	<2				<2	<2	4	<2	<2	2			14	80	<2	320	<2	<2	<2	<2	<2						<2	<2		<2	16,000
				May-03				<2		<2	<2						2	<2	<2	<2			110	330	<2	460		<2	<2	<2	<2						<2				140
				Aug-03			<2	<2	<2		<2				<2	<2	4	<2	2	13			5	660	<2	800	<2			<2	<2	<2						<2	<2		9,700
				Nov-03				210		<2	<2						3	<2	<2	<2			45	1,700	<2	840		<2	<2	<2	<2						<2				16,000
				Feb-04		<2		<2	<2	<2	<2				<2	4	3	<2	<2	<2			8	1,600	<2	270	<2	<2	<2	<2	<2						<2	<2		<2	9,600
				Jul-04				14											<2.1	<2.1																					
				Aug-04		<2		<2	<2	<2	<2	<2	<2	<2	<2	140	2	<2	150	1,700			110	2,700	<2	75	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	14,000
				Sep-04				<2.1											<2.1	940																					
				Oct-04				<2.1											<2.1	220																					
				Nov-04				25											<2.1	14																					
				Feb-05		<0.4		<0.4	<0.4	<0.4	<0.4				<0.4	<0.4	2	<0.4	<0.4	<0.4			81	1,800	1	12	<0.4	<0.4	<0.4	<0.4	<0.4						1	<0.4		<0.4	9,600
				Mar-05				8.6											22	99																					
				Apr-05																	8,800	11																				
				May-05[1]	<0.45			6													8,500	<0.45		1,600																	
				May-05[2]				3		<0.4	<0.4						2	<0.4	1	12			52	1,100	<0.4	24		<0.4	<0.4	<0.4	<0.4						2				5,600
				May-05[3]	<0.45			18											<0.45	5.8	9,900	<0.45		1,500																	
				Jun-05	5.7			49											<0.45	<0.45	8,100	<0.45		1,100																	
				Aug-05[4]	<2.5			220											<2.5	<2.5	6,600	<2.5		750																	
				Aug-05[5]		<0.4		250								4			<0.4	<0.4	7,100		24	820	<0.4	75	<0.4														9700
				Sep-05	<2.5			480											<2.5	<2.5	7,200	<2.5		860																	
				Oct-05	<2.5			290											<2.5	<2.5	6,700	<2.5		630																	
				Nov-05[6]							<2						2 J	<2	<2	<2	7,000	<2	10	530	<2	20		<2	<2	<2	<2						<2				5,000
				Nov-05[7]	5.6			6.2											<2.5	<2.5	6,500	<2.5		520																	
				Dec-05	7.3			<2.5											<2.5	<2.5	5,000	<2.5		490																	
				Jan-06	<2.5			32											<2.5	<2.5	4,100	<2.5		340																	
				Feb-06	<2.5	<2		6 J	<2	<2	<2				<2	<2	<2	<2	<2	<2	5,000	<2	3 J	370	<2	440	<2	<2	<2	<2	<2						<2	<2		<2	5,800
				Mar-06	<2.5			<2.5											<2.5	<2.5	5,200	<2.5		280																	
Toluene	L	200	1,000	Feb-97			<10	<10	<10		<10	<10		<10	<10	<10	<10									110	<10			<10	<10	<10	<10	<10	<10	<10	<10	<10			<10
				Nov-98		0.3	<0.2	<0.2	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	10					<0.2	<0.2	<0.2	9	<0.2	<0.2	<0.2	<0.2	2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
				Feb-99		<0.2	<0.2	<0.2	<0.2	0.4	0.7	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2					0.2	0.2	<0.2	0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
				May-99		<0.2	<0.2	<0.2	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2					0.5	<0.2	<0.2	16	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Table 1 *(continued)*
Summary of VOC Detections
Hagen Farm Site
Town of Dunkirk, Wisconsin

PARAMETER	UNITS	PAL	ES	DATE	WELLS																																				
					FWI	1G-04	MW1	MW22	MW23	MW26	MW27	MW29	MW30	MW32	MW33	MW7	OB11M	OB8M	OBS-1A	OBS-1B	OBS-1C	OBS-2C	P17B	P17C	P17DR	P22B	P22C	P26B	P26C	P27B	P28B	P28C	P29B	P29C	P30B	P30C	P32B	P33B	P35B	P40D	P7B
Toluene	L	200	1,000	Aug-99		<0.2	0.4	<0.2	0.3	0.8	<0.2	<0.2	<0.2	<0.2	0.3	<0.2	<0.2	0.8					0.4	<0.2	0.8	<1	0.2	0.4	0.6	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.8	0.6	<2
(continued)				Nov-99		<0.2						<0.2		<0.2	<0.2	<0.2	<0.2	<0.2													<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.7	<0.2	<13
				Feb-00		<0.2		<0.2	<0.2	<0.2		<0.2	<0.2				<0.2						<0.2	<0.2	<0.2	0.5	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2				
				Aug-00		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.3	<0.2	<0.2	0.5					0.3	0.3	<0.2	0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.3	<0.2	<0.2	1	<0.2	<2
				Feb-01		0.5		<0.4	0.8	0.8					0.7	0.3							0.6	0.7	0.9	2	0.3	0.8	0.6									0.6		0.8	<10
				May-01				<0.1		<0.1	<0.1						<0.1	<0.1	<0.1	<2			<0.1	<0.1	<0.1	4		<0.1	<0.1	<0.1	<0.1					<0.1				<2
				Aug-01		0.7	0.8	<0.1	0.8	1	<0.1	<0.1	<0.1	<0.1	<0.1	2	0.3	0.2	<0.1	<0.5			0.2	<0.1	<0.1	<1	0.4	0.4	<0.1	<0.1	<0.1	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	<0.1	<10
				Nov-01				<0.1		0.4	<0.1						0.2	1	<0.1	0.3			0.2	0.2	0.2	0.7		<0.1	<0.1	<0.1	<0.1					<0.1				0.2
				Feb-02		<0.1		<0.1	<0.1	0.3	<0.1				<0.1	<0.1	<0.1	<0.1	<0.1	1			<0.1	<0.1	<0.1	4	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	<0.1		<0.1	<19
				May-02				<0.1		0.2	<0.1						<0.1	0.3	0.2	0.3			<0.2	0.2	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1					<0.1				<10
				Aug-02		0.6	<0.1	<0.1	<0.1	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.5	0.4	<0.1	<0.1			0.3	0.7	0.3	0.3	0.8	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	2	<0.1	50
				Nov-02				<0.3		<0.3	<0.3						<0.3	<0.3	<0.3	<0.3			0.4	0.6	<0.3	0.6		<0.3	<0.3	<0.3	<0.3					<0.3				<34
				Feb-03		0.3		<0.3	<0.3	<0.3	<0.3				<0.3	<0.3	0.3	0.6	<0.3	<0.3			<0.3	<1	<0.3	<0.7	0.6	<0.3	<0.3	<0.3	<0.3					0.3	<0.3		<0.3	<34
				May-03				<0.3		0.4	<0.3						<0.3	0.3	<0.3	<0.3			<0.3	0.6	<0.3	<3		<0.3	<0.3	<0.3	<0.3					0.7				<0.3
				Aug-03		0.6	<0.3	<0.3	<0.3	<0.4	<0.3	<0.4	<0.4		<0.3	<0.3	1	0.3	<0.3	<0.3			<0.3	0.7	<0.3	<0.7	0.3	<0.4	<0.4	<0.3	<0.3	<0.3	<0.4	<0.4	<0.4	<0.4		<0.3	1	<0.4	<17
				Nov-03							<0.4						<0.4	2	<0.4	<0.4										<0.4	<0.4					<0.4				<18
				Aug-04		<0.4		<0.4	<0.4	<0.4			<0.4	<0.4	<0.4	<0.4		<0.4	<0.4	2			<0.4	<7	<0.4	<3	1	<0.4	<0.4				<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
				Feb-05		<0.4				<0.4	<0.4						<0.4	0.6	<0.4	0.6			<0.4	<4	<0.4			<0.4	<0.4	<0.4	<0.4					<0.4			<0.4		
				May-05[2]							<0.4						<0.4	0.5	<0.4	<0.4										<0.4	0.4					0.5				
				Aug-05[4]	<0.35			<0.35											<0.35	<0.35	2.9	<0.35		<0.35																	
				Aug-05[5]			<3		<3			<3	<3	<3			0.6 J	<3				<3									<3	<3	<3	<3	<3	<3	<3		0.5 J		
				Dec-05	<0.35			<0.35											<0.35	<0.35	2.6	<0.35		<0.35																
				Feb-06	<0.35	<0.3		<0.3	<0.3	<0.3	<0.3				<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	2	<0.3	<0.3	0.5 J	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3					<0.3	<0.3		<0.3	<0.3
				Mar-06	<0.35			<0.35											<0.35	<0.35	2.3	<0.35		<0.35																
Trichloroethylene	L	0.5	5	Nov-98				<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2					<0.2	2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2
				Feb-99		<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2			<0.2	<0.2					<0.2	0.6	<0.2	<0.2	<0.2	0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	
				May-99			<0.2	<0.2		<0.2	<0.2		<0.2		<0.2	<0.2	<0.2						<0.2	0.6	<0.2	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2		<0.2		<0.2	<0.2
				Aug-99		<0.2								<0.2				<0.2					<0.2	0.5	<0.2											<0.2		<0.2	<0.2	
				Nov-99						<0.2													<0.2	0.4	<0.2			<0.2	<0.2											
				Feb-00		<0.2		<0.2	<0.2	<0.2		<0.2	<0.2				<0.2						<0.2	0.4	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2					
				Aug-00									<0.2										<0.2	0.2	<0.2										<0.2	<0.2					
				Feb-01		<0.1		<0.5	<0.1	<0.1					<0.1	<0.1							<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1									<0.1		<0.1	<13
				May-01				<0.1		<0.1	<0.1						<0.1	<0.1	<0.1	<3			<0.1	0.2	<0.1	<0.7		<0.1	<0.1	<0.1	<0.1					<0.1				<3
				Aug-01							<0.1		<0.1										<0.1	0.3	<0.1					<0.1				<0.1	<0.1					
				Aug-04		<0.2				<0.2				<0.2		<0.2		<0.2	<0.2	<0.2			<0.2	<5	<0.2			<0.2	<0.2								<0.2		<0.2	<0.2	0.5
				Feb-05		<0.2				<0.2	<0.2						<0.2	<0.2	<0.2	<0.2			<0.2	<2	<0.2			0.2	<0.2	<0.2	<0.2					<0.2			<0.2	
				Aug-05			<0.3		<0.3			<0.3	<0.3	<0.3			<0.3	<0.3				0.4 J								<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3		<0.3		
Vinyl chloride	L	0.02	0.2	May-97			<1	1		<1	<1	<1	<1	<1	<1	<1	3	<1					11	15	<1	<7	<1	7	<1	2	5	<1	<1	<1	<1	<1	1	<1	<1	<1	<1
				Aug-97				2		<1	<1	<1	<1	<1	<1	<1	4	<1					11	21	<1	3	<1	7	<1	2	4	<1	<1	<1	<1	<1	1	<1	<1	<1	<1
				Nov-97			<1	2	<1	<1	<1	<1	<1	<1	<1	<1	4	<1					17	20	<1	4	<1	7	<1	2	3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Table 1 *(continued)*
Summary of VOC Detections
Hagen Farm Site
Town of Dunkirk, Wisconsin

PARAMETER	UNITS	PAL	ES	DATE	WELLS																																						
					EW1	IG-04	MW1	MW22	MW23	MW26	MW27	MW29	MW30	MW32	MW33	MW7	OB11M	OB8M	OBS-1A	OBS-1B	OBS-1C	OBS-2C	P17B	P17C	P17DR	P22B	P22C	P26B	P26C	P27B	P28B	P28C	P29B	P29C	P30B	P30C	P32B	P33B	P35B	P40D	P7B
Vinyl chloride	L	0.02	0.2	Feb-98			<1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1					9	18	<1	3	<1	6	<1	1	2	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1
(continued)				May-98		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2	<1					11	16	<1	3	<1	4	<1	<1	2	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1
				Aug-98		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2	<1					10	16	<1	3	<1	5	<1	3	2	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1
				Nov-98				3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	4	<0					50	110	<0.2	21	<0.2	21	<0.2	10	5	<0.2	<0.2	<0.2	<0.2	<0.2	4		<0.2	<0.2	<0.2
				Feb-99		<0.2	<0.2	0.6	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	0.7					13	24	<0.2	3	<0.2	5	<0.2	2	0.4	<0.2	<0.2	<0.2	<0.2	<0.2	1	<0.2	<0.2	<0.2	<0.2
				May-99		<0.2	<0.2	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	2	0.4					13	24	<0.2	4	<0.2	4	<0.2	5	2	<0.2	<0.2	<0.2	<0.2	<0.2	1	<0.2	<0.2	<0.2	<0.2
				Aug-99		<0.2	<0.2	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	1	0.6					20	28	<0.2	2	<0.2	5	<0.2	10	5	<0.2	<0.2	<0.2	<0.2	<0.2	1	<0.2	<0.2	<0.2	<2
				Nov-99		<0.2	<0.2	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	1	<0.2					11	18	<0.2	0.9	<0.2	3	<0.2	7	2	<0.2	<0.2	<0.2	<0.2	<0.2	0.8	<0.2	<0.2	<0.2	<17
				Feb-00		<0.2		0.8	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	1	0.3					12	20	<0.2	2	<0.2	5	<0.2	5	2	<0.2	<0.2	<0.2	<0.2	<0.2	0.6	<0.2	<0.2	<0.2	<4
				Aug-00		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	3	0.5					12	18	<0.2	4	<0.2	5	<0.2	7	3	<0.2	<0.2	<0.2	<0.2	<0.2	2		<0.2	<0.2	<2
				Feb-01		<0.1		<0.4	<0.1	<0.1					<0.1	<0.1							14	23	<0.1	6	<0.1	3	<0.1									<0.1		<0.1	<11
				May-01				<0.1		<0.1	<0.1						2	0.5	<0.1	15			10	16	<0.1	2		2	<0.1	2	2					0.8				<3
				Aug-01		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	3	1	<0.1	4			13	20	<0.1	2	<0.1	3	<0.1	3	3	<0.1	<0.1	<0.1	<0.1	<0.1	1	<0.1	<0.1	<0.1	<11
				Nov-01				<0.1		<0.1	<0.1						2	0.2	<0.1	3			5	22	<0.1	4		3	<0.1	2	3					1				1
				Feb-02		<0.1		<0.1	<0.1	<0.1	<0.1				<0.1	<0.1	4	<0.1	<0.1	<0.5			2	19	<0.1	2	<0.1	3	<0.1	0.8	3					0.8	<0.1		<0.1	<22
				Mar-02	2.8			<0.11											<0.11	<0.11			<5.5	8.5																	
				May-02				<0.1		<0.1	<0.1						4	0.3	<0.1	0.3			1	16	<0.1	2		2	<0.1	1	4					0.8				<11
				Aug-02		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	4	0.6	<0.1	0.3			1	16	<0.1	3	<0.1	2	<0.1	2	4	<0.1	<0.1	<0.1	<0.1	<0.1	0.7	<0.1	<0.1	<0.1	<11
				Nov-02				<0.4		<0.4	<0.4						4	0.7	<0.4	0.6			1	17	<0.4	2		2	<0.4	2	4					0.7				<40
				Feb-03		<0.4		<0.4	<0.4	<0.4	<0.4				<0.4	<0.4	4	1	<0.4	0.8			1	13	<0.4	4	<0.4	3	<0.4	2	2					0.7	<0.4		<0.4	<40
				May-03				<0.4		<0.4	<0.4						2	<0.4	<0.4	1			2	11	<0.4	<4		2	<0.4	2	3					0.6				<0.4
				Aug-03		<0.6	<0.4	<0.4	<0.4	<0.6	<0.4	<0.6	<0.6	<0.4	<0.4	<0.4	2	1	<0.4	3			1	12	<0.4	2	<0.4	2	<0.6	1	2	<0.4	<0.6	<0.6	<0.6	<0.6	0.7	<0.4	<0.4	<0.6	<20
				Nov-03				<0.6		<0.6	<0.6						2	1	<0.6	<0.6			1	10	<0.6	3		2	<0.6	1	2					<0.6				<29
				Feb-04		<0.6		<0.6	<0.6	<0.6	<0.6				<0.6	<0.6	1	1	<0.6	<0.6			0.9	10	<0.6	3	<0.6	2	<0.6	0.7	1					<0.6	<0.6		<0.6	<29
				Aug-04		<0.6		<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	0.7	0.9	<0.6	7			1	<12	<0.6	7	<0.6	2	<0.6	<0.6	1	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	4
				Sep-04				<0.59											<0.59	4.4																				
				Oct-04				<0.59											<0.59	2.6																				
				Nov-04				<0.59											<0.59	2																				
				Dec-04	0.06																																				
				Dec-04				<0.59											<0.59	1.1																				
				Feb-05		<0.6		<0.6	<0.6	<0.6	<0.6				<0.6	<0.6	1	<0.6	<0.6	0.7			1	7	<0.6	3	<0.6	1	<0.6	<0.6	1					<0.6	<0.6		<0.6	<29
				Apr-05																	<0.59	3																		
				May-05[1]	<0.59			<0.59											<0.59	<0.59	6.9	<0.59		5.1																
				May-05[2]				<0.6		<0.6	<0.6						1	1	<0.6	<0.6	13		0.9	<6	<0.6	3		2	<0.6	<0.6	1					<0.6				<29
				May-05[3]	<0.59			<0.59											<0.59	<0.59	<0.59	4.2		<0.59																
				Aug-05[4]	1.9			<0.24											<0.24	<0.24	12	<0.24		5.5																
				Aug-05[5]		<0.6	<0.2	<0.6	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.6	<0.2	<0.2	<0.6	0.6 J	<24	<0.2	1 J	6 J	<0.6	3	<0.6	1	<0.2	<0.2	0.8	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<47
				Sep-05	<0.24			<0.24											<0.24	<0.24	<4.8	<0.24		5.9																
				Oct-05	<0.24			<0.24											<0.24	<0.24	<4.8	<0.24		5.1																
				Nov-05[6]				<0.2		<0.2	<0.2						0.5 J	<0.2	<0.2	<0.2	<12	<0.2	0.7	5	<0.2	2		<0.2	<0.2	<0.2	<0.2					<0.2				<2

Table 1 *(continued)*
Summary of VOC Detections
Hagen Farm Site
Town of Dunkirk, Wisconsin

PARAMETER	UNITS	PAL	ES	DATE	WELLS																																				
					EW1	IC-04	MW1	MW22	MW23	MW26	MW27	MW29	MW30	MW32	MW33	MW7	OB11M	OB8M	OBS-1A	OBS-1B	OBS-1C	OBS-2C	P17B	P17C	P17DR	P22B	P22C	P26B	P26C	P27B	P28B	P28C	P29B	P29C	P30B	P30C	P32B	P33B	P35B	P40D	P7B
Vinyl chloride	L	0.02	0.2	Nov-05[7]	<0.24			<0.24											<0.24	<0.24	<0.24	<0.24		6.1																		
(continued)				Dec-05	<0.24			<0.24											<0.24	<0.24	12	<0.24		5.6																		
				Jan-06	<0.24			<0.24											<0.24	<0.24	<0.24	0.18		5.4																		
				Feb-06	<0.24	<0.2		<0.2	<0.2	<0.2	<0.2				<0.2	<0.2	0.58	1	<0.2	<0.2	8	0.22	0.6 J	4	<0.2	2	<0.2	0.6 J	<0.2	0.21	0.39						0.15	<0.2		<0.2	5
				Mar-06	<0.24			<0.24											<0.24	<0.24	9.9	<0.24		4.4																		
Xylenes-total	L	1,000	10,000	Nov-96			<10	1100	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10					190	650	<10	1,300	<10	<10	<10	<10	<10		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
				Feb-97			<10	490	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10					17	880	<10	3,000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
				May-97			<10	62		<10	<10	<10	<10	<10	<10	<10	<10	<10					<10	590	<10	3,700	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
				Aug-97				<10		<10					<10	<10	<10						14	510	<10	700	<10	<10	<10		<10	<10					<10		<10	<10
				Nov-97			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10					96	210	<10	490	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
				Feb-98			<10	74	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10					44	100	<10	320	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
				May-98		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10					51	39	<10	290	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
				Aug-98				<10		<10					<10								30	<10	<10	510	<10	<10	<10									<10		<10	
				Nov-98				11	<0.5	<0.5	5	<0.5	<0.5	<0.5		<0.5	200	8					80	23	<0.5	3,700	<0.5	7	6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5
				Feb-99		<0.5	<0.5	1	<0.5	0.3	<0.5	<0.5	<0.5	<0.5	0.3	<0.5	<0.5	<0.5					9	3	<0.5	360	<0.5	<0.5	<0.5	0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.3	<0.5	<0.5	<0.5
				May-99			<0.5	1		<0.5	<0.5		<0.5		<0.5	<0.5	<0.5						8	2	<0.5	390	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	<0.5		<0.5		<0.5	<0.5
				Aug-99		<0.5	<0.5	0.9	<0.5	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1					7	2	1	200	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1	0.5	<5
				Nov-99			<0.5	<0.5	<0.5	<0.5	<0.5		<0.5										0.8	4	<0.5	86	<0.5	<0.5	<0.5	<0.5					<0.5	<0.5					
				Feb-00		<0.5		<0.5	<0.5	<0.5		<0.5	<0.5				<0.5						<0.5	4	<0.5	23	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					
				Aug-00		<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5					<0.5	2	<0.5	19	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		2	<0.5	<5
				Feb-01		<0.5		<2	<0.5	<0.5					<0.5	<0.5							7	0.009	<0.5	0.18	<0.5	<0.5	<0.5									<0.5		<0.5	<51
				May-01				<0.5		<0.5	<0.5						<0.5	<0.5	<0.5	240			0.5	5	<0.5	200		<0.5	<0.5	<0.5	<0.5					<0.5				<13
				Aug-01		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5			<0.5	19			0.6	4	<0.5	62	<0.5	<0.5	<0.5	<0.5					<0.5	<0.5		<0.5		<0.5	<51
				Nov-01				<0.5		<0.5	<0.5						<0.5	0.8	<0.5	35			5	14	<0.5	37		<0.5	<0.5	<0.5	<0.5					<0.5				<0.5
				Feb-02		<0.5		<0.5	<0.5	<0.5	<0.5				<0.5	<0.5	<0.5	<0.5	<0.5	10			4	39	<0.5	20	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	<0.5		<0.5	<100
				Mar-02	2.2			<0.51											<0.51	<0.51			<330	70																	
				May-02				<0.5		<0.5	<0.5						<0.5	<0.5	<0.5	1			3	70	<0.5	6		<0.5	<0.5	<0.5	<0.5					<0.5				<51
				Aug-02		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	0.5			7	96	<0.5	5	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3	<0.5	<51
				Nov-02				<0.5		<0.5	<0.5						<0.5	<0.5	<0.5	<0.5			2	180	<0.5	27		<0.5	<0.5	<0.5	<0.5					<0.5				<51
				Feb-03				<0.5		<0.5					<0.5	<0.5			<0.5	<0.5			<0.5	170	<0.5	7	<0.5	<0.5	<0.5									<0.5		<0.5	<51
				May-03				<0.5		<0.5									<0.5	<0.5			4	220	<0.5	10		<0.5	<0.5												<0.5
				Aug-03			<0.6	<0.6	<0.6		<0.6				<0.6	<0.6	<0.6	<0.6	<0.6	7			<0.6	300	<0.6	7	<0.6			<0.6	<0.6	<0.6						<0.6	1		<29
				Nov-03				<0.6		<0.6	<0.6						<0.6	0.9	<0.6	<0.6			<0.6	380	<0.6	6		<0.6	<0.6	<0.6	<0.6					<0.6				<29
				Feb-04		<1		<1	<1		<1				<1	<1			<1	<1			<1	400	<1	5	<1			<1								<1			<50
				Aug-04		<1		<1	<1	<1			<1	<1	<1	<1		<1	<1	210			<1	700	<1	20	<1	<1	<1						<1	<1		<1	<1	<1	<1
				Sep-04				<1											<1	88																				
				Oct-04				<1											<1	29																				
				Nov-04				<1											<1	4.7																				
				Feb-05		<0.6		<0.6	<0.6	<0.6	<0.6				<0.6	<0.6	<0.6	<0.6	<0.6	<0.6			<0.6	630	0.6	2	<0.6	<0.6	<0.6	<0.6	<0.6						<0.6	<0.6		<0.6	<32

Table 1 *(continued)*
Summary of VOC Detections
Hagen Farm Site
Town of Dunkirk, Wisconsin

PARAMETER	UNITS	PAL	ES	DATE	WELLS																																				
					EW1	IG-04	MW1	MW22	MW23	MW26	MW27	MW29	MW30	MW32	MW33	MW7	OB11M	OB8M	OBS-1A	OBS-1B	OBS-1C	OBS-2C	P17B	P17C	P17DR	P22B	P22C	P26B	P26C	P27B	P28B	P28C	P29B	P29C	P30B	P30C	P32B	P33B	P35B	P40D	P7B
Xylenes-total	L	1,000	10,000	Apr-05																	600	<0.63																				
(continued)				May-05[1]																																						
				May-05[2]	<0.53			<0.6		<0.6									<0.63	<0.63	1,200	<0.63	<0.6	370	<0.6	2		<0.6	<0.6												<32
				May-05[3]																																						
				Jun-05	<0.53			<0.63											<0.63	<0.63	1,300	<0.63		390																		
				Aug-05[4]	<1.6			<1.6											<1.6	<1.6	1,200	<1.6		330																		
				Aug-05[5]		<6		<6								<6			<6	<6	1,400		<6	400	<6	2	<6														<50
				Sep-05	<0.45			<0.45											<0.45	<0.45	1,200	<0.45		330																		
				Oct-05	<0.93			<0.93											<0.93	<0.93	1,300	<0.93		330																		
				Nov-05[6]				<0.9		<0.9	<0.9						<0.9	<0.9	<0.9	<0.9	1,300	<0.9	<0.9	180	<0.9	11		<0.9	<0.9	<0.9	<0.9						<0.9				<9
				Nov-05[7]	<0.93			<0.93											<0.93	<0.93	1,300	<0.93		340																		
				Dec-05	<0.93			<0.93											<0.93	<0.93	1,300	<0.93		300																		
				Jan-06	<0.93			<0.93											<0.93	<0.93	1,100	<0.93		270																		
				Feb-06	<0.93	<0.9		<0.9	<0.9	<0.9	<0.9				<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	1,200	<0.9	<0.9	260	<0.9	9	<0.9	<0.9	<0.9	<0.9	<0.9						<0.9	<0.9		<0.9	<0.9
				Mar-06	<0.93			<0.93											<0.93	<0.93	1,000	<0.93		220																		

Notes:

[1] Sampled on May 13, 2005

[2] Sampled on May 16–17, 2005.

[3] Sampled on May 26, 2005.

[4] Sampled on August 1, 2005.

[5] Sampled on August 2–5, 2005

[6] Sampled on November 17–18, 2005.

[7] Sampled on November 21, 2005.

Blank cells indicate no analysis.

Only sampling rounds having at least one detection for a given parameter in any of the groundwater wells are displayed in this table.

Table 2 *(continued)*
Summary of Indicator Parameters
Hagen Farm Site
Town of Dunkirk, Wisconsin

					WELLS																																		
PARAMETER	UNITS	PAL	ES	DATE	SW1	IG-04	MW1	MW22	MW23	MW26	MW27	MW29	MW30	MW32	MW33	MW7	OB11M	OB8M	OBS-1A	OBS-1B	OBS-1C	OBS-2C	P17B	P17C	P17DR	P22B	P22C	P26B	P26C	P27B	P28B	P28C	P29B	P29C	P30B	P30C	P32B	P33B	P35B	P40D	P7B
Alkalinity -	mg/L			Jan-06	272			363											284	504	417	403		380																	
total as $CaCO_3$				Feb-06	548	208		412	394	350	282				287	264	424	329	305	544	463	410	322	392	284	469	304	456	279	291	313						356	297		269	316
(continued)				Mar-06	313			392											283	553	463	420		390																	
Chemical	mg/L			Nov-96			15	17	151	<0	48	<0	13	<0	<0	<0	<0	<0					19	14	<0	49	<0	<0	<0	<0	<0	<0	<0	<0	<0	<0	<0	<0	<0	<0	<0
oxygen demand				Aug-97			21	19	74	7	<7	<7	7	17	<7	14	15	8					10	28	<7	48	<7	24	26	14	17	<7	7	11	11	14	<7	9	<7	<7	8
				Aug-98		17	16	25	19	20	19	24	38	19	21	20	38	13					9	25	60	76	19	40	61	33	138	59	11	118	14	11	14	109	17	17	26
				Aug-99		<2.2		14.7	14.7		11.8	<2.2	10.1	15		9.8	14.7	<2.2					11.1	13.7	<2.2	30.4	<2.2			19	13.7	<2.2	<2.2	<2.2	10.1	<2.2	<2.2		<2.2	<2.2	26.5
				Aug-00		<2.2		7.1	11.3	<2.2	<2.2	7.4	<2.2	11.7		5.8	6.4	7.1					<2.2	10.7	<2.2	24.8	<2.2	9	<2.2	<2.2	5.8	<2.2	<2.2	<2.2	<2.2	<2.2	9.4		<2.2	<2.2	30.4
				Aug-01		<2.2	18.2	<2.2	39.5	<2.2		<2.2		6.1	<2.2	<2.2	<2.2	<2.2	<2.2	38.9						20.8	<2.2	<2.2	<2.2		<2.2	9	<2.2	<2.2			<2.2	<2.2	<2.2	<2.2	34
				Aug-02		<2.2	11	<2.2	13	6.2	<2.2	<2.2	35	8.1	6.5	7	<2.2	16.5	<2.2	28			12	22	9.1	17.4	<2.2	10	<2.2	16	13	<2.2	8.4	<2.2	<2.2	8.8	<2.2	<2.2	7.5	9.1	7.2
				Aug-03			<3.7	<3.7	<3.7		<3.7			18.8		<3.7			<3.7	21.9			10.1	14.8		24.6	<3.7			<3.7							<3.7				19.5
				Aug-04		<2.2		16.5	9.6	<2.2			18.9	<2.2	17.5	<2.2		<2.2	30.4	35.3			11.9	23.1	<2.2	33.9	<2.2	<2.2	<2.2							<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	33.9
				Aug-05		<2.2	3.7 J	10	6.3 J	8.7	3.3 J	<2.2	2.8 J	14	6 J	10	7.9	4 J	7.8	20.1	48.4	4.4 J	7.7	23.1	2.6 J	18.8	5.3 J	18.1	<2.2	<2.2	8.8	10.1	<2.2	2.8 J	<2.2	<2.2	4.4 J	<2.2	<2.2	<2.2	27.2
Chloride -	mg/L	125	250	Nov-96			14.2	15.5	5.1	68.3	36.9	16.1	165	14.8	2.6	20.9	37.8	30					24.9	46.8	2.6	27.7	17.2	15.2	18.3	35.4	68.9	20.2	31.2	14.7	13	10.2	43.8	15.9	20.5	19.2	4.9
dissolved as Cl				Aug-97			9.5	25.4	5.3	38.2	26.7	4.8	145	16.2	2.6	30.2	37.3	30.9					33.9	52.4	2.9	19	17.4	15.4	16.8	54.1	64.9	19.8	24	13.4	14.5	10.1	43.9	15.5	19.3	17.7	12.6
				Aug-98		43.9	10.7	29.4	2.9	26.6	7.5	8.2	90.1	17	2.4	32.6	39.4	32.6					36.6	47.6	3	26.4	19.1	14.2	18	44.1	65.3	20.3	22.8	15.7	18	11.5	44.6	16	21	18.5	20
				Aug-99		41.5		28.9	2.7		4.1	8.5	74.4	12.3		26.7	46.3	34.6					41.4	49	3	28.5	17.9			37.2	88.8	20.2	21.7	15	25.7	11.7	45.9		22.3	19.2	21.3
				Aug-00		44.4		33.9	1.6	21.7	5.4	15.4	56.1	18.1	2.6	24.3	48	34.9					31.2	44.4	4.3	27.8	21.5	15	20	31.4	87.3	22.3	22.4	17.2	30.9	15.2	42.8	23.2	24	21.2	25.7
				Aug-01		35	13.7	26.8	2.8	15.6	15.6	5.2	68	22.1	2	22	54.4	38.2	5.6	98.2			39	44	4.8	30.6	22.4	14.1	21.3	69.6	85	24	22.2	17.7	31.3	16.8	41.2	25.8	25.2	22.4	29.4
				May-01				25.2		13.2	13						53.5	37.4	7.3	102			42.7	43.3	7.2	36.2		13.3	21.1	75.4	83.9						42.6				29.6
				Nov-01				27.6		15	20.5						54.1	36.9	6.8	101			31.7	44.1	18.5	34		14.3	21.4	87.4	82						40.1				33.1
				Feb-02		37.4		23.6	2.6	12.1	23				1.7	21.1	60.1	39.4	12.8	101			27.4	43	3.7	33.3	23.4	12.3	22.8	109	82.4						43.1	28.5		23.7	33
				May-02				20.3		12.4	30.9						51.8	36.5	6.7	90.6			26.4	43.2	4.4	32		13.1	21.7	104	76.9						37.8				29
				Aug-02		20.9	10.6	16.2	1.7	9.8	18.6	6.2	54	21.5	0.99	17.8	46.5	34.3	4.7	90.4			24.7	41.7	3.4	26.6	19.7	10.2	19.6	80.6	60.2	21.5	20.2	14.8	27.4	13.8	36.7	24.5	22.7	20.4	26.2
				Nov-02				16.6		19.1	76.8						52.9	35.5	2.5	91			26.9	39.2	4.8	31.8		12.9	21.6	88.9	72.1						39.7				23
				Feb-03		27.1		11.1	7.8	17.7	25.2				1.9	24.3	11.1	40.9	5	86.2			28.2	41.5	4	31.3	23.2	11.2	22.3	82.8	78.2						42	28		22.9	24.5
				May-03				17		37.1	108						61	40	3.5	85.1			28.2	38.1	3.4	39		13.6	22.6	45.2	70.1						39.6				24.1
				Aug-03		21.8	11.9	10.8	10.2	14.5	11.4	16.2	12.1	24.2	1	7.4	60.2	40.6	49.3	86.2			27	40.9	4.1	35.7	23.4	10.5	22	37	65.8	24.3	21.9	17	27.2	15.6	39.8	28.5	25	22.8	24.5
				Nov-03				9.5		10.7	91.4						55.2	40	4.5	85.5			25.7	37.3	3.8	26.9		11.4	20.5	25.6	54.5						35.9				20.4
				Feb-04		1.2		10	10.2	9.9	88.8				1.9	18.7	58.6	42.1	9.1	88.4			26.5	40.7	3.9	29.3	24.2	10.6	22.5	49.4	57.6						19.7	29.8		22.8	25.3
				Aug-04		2.9	12.7	9	3.3	24.7	39.6	15.7	308	28.1	1.4	8.4	59.3	40.9	68.9	61.9			24.5	40.3	5	28.9	23.1	11.4	22.4	33.9	57.2	25.4	26.7	20	20	15.4	37.3	28.1	25	23	26.2
				Feb-05		1.6		8.2	5.8	43.4	35.5				2	4.5	60.5	44	7.6	78			24.6	40.3	5	28.6	24.9	12	23.5	35.7	56.8						42.3	29.7		24.4	30.1
				Aug-05		1.9	11.7	7.8	2.8	31.7	35.7	11.7	81.5	24.3	1.6	2.7	66	45.4	4.8	66.3	34.6	32.9	19.8	34.9	4.8	25.6	22	10.8	21.8	34.6	52.5	23.8	24.1	18.8	13.7	15.3	36	26.7	23.4	22.1	19.1
Dissolved	mg/L			May-98		10.1	6.1	1.4	7.9	5.6	3.1	8.1	2.3	2.3	5.7	7	3.7	10.6					1.6	0.9	12.5	0	3.9	1	4.8	0	0	3.7	4.1	5.5	2.1	3.9	0	6.4	5.9	8.4	0
oxygen - field				Aug-98		8	8.2	2.1	7.3	5.2	4.9	9.2	6.1	4.5	2.4	5	6.4	8.2					2.2	1.6	12.1	1.1	6.8	1	4.9	1.7	2.1	4.6	6.2	6.9	3.5	5.1	0.8	6.1	2.6	8.2	2.2
				Nov-98		8.3	7.8	3.9	7.1	5.7	7.5	9.3	5.3	5	1.8	6.6	7.8	7.4					4	3	11.7	2.2	8.6	3.5	7.5	4.4	3.2	6.7	7.4	7.5	4.7	5.6	4.8	4.9	8.6	8.1	4.4
				Feb-99		9.8	6.6	0	5.4	2.4	3.2	7.6	0	0	3	3.3	6.9	3.5					1.4	0	7	1.1	4.5	1.3	3.4	1.3	0.4	2.5	3.3	4.6	0.5	3.1	6	6.1	4.7	5.3	0
				May-99		6.1	8.2	0.6	5.8	3.8	4.2	7.4	3	4.7	3	3.8	4.7	7					3.1	0.9	9.4	0	8.3	0.2	4.3	3	1.8	4.5	5	5.1	3.1	5	0.6	5.2	8.3	7.2	0.1
				Aug-99		6.8	7.7	0.7	6	4.8	3.4	7.5	1.3	5.4	3.2	3.6	5.8	5.9					2.3	0.9	8.7	0.6	8.4	2.8	5.2	1.4	0.4	4.5	4.8	5.5	3.2	4.5	1.1	4.8	6	6.4	1.8
				Nov-99		7	8.5	2.8	4.4	4.1	5.7	8.1	3.8	4	3.3	6.7	7.3	8					2.1	1.2	9.6	3.1	7.1	3.8	4.2	3.9	1	4.7	5.7	6.4	5.5	6	0.8	4.9	6.8	5.9	2
				Feb-00		8.6		1.4	8.7	5.9	5.5	7.6	1.9	6.5	2.2	7.5	5.5	8.6					1.9	0.8	12.4	1.4	10.1	0.9	5.2	1.4	1.7	6.1	4.8	8.5	4	5	1.9	5.4	10	7.9	1.2
				Aug-00		6.6		3.1	3.9	3.8	4.6	7.1	1.9	5.7	7.8	2.6	2.4	6.1					0.7		7.3	0.5	6.9	0.8	2.1	3	0	3.8	2.3	4	5.4	4.4	2.3	6.9	4.8	4	0.6
				Feb-01		9.6		8.1	7	5.2					3.4	4.1							4.4	2.4	11.3	1.6	6	3.5	5.8									4.6		6.6	1.3

Table 2 *(continued)*
Summary of Indicator Parameters
Hagen Farm Site
Town of Dunkirk, Wisconsin

PARAMETER	UNITS	PAL	ES	DATE	WELLS																																			
					WI	JG-04	MW1	MW22	MW23	MW26	MW27	MW29	MW30	MW32	MW33	MW7	OB11M	OB8M	OBS-1A	OBS-1B	OBS-1C	OBS-2C	P17B	P17C	P17DR	P22B	P22C	P26B	P26C	P27B	P28B	P28C	P29B	P29C	P30B	P30C	P32B	P33B	P35B	P40D	P7B
Dissolved oxygen - field (continued)	mg/L			May-01				9		4.5	2						3.9	7.6	4	3.4			1.8	0.1	10.4	0.9		0.4	3.7	1.3	0						4				3.3
				Aug-01		6.3	6.8	8	2.9	3.9	2.7	6.6	2.3	4.2	2.2	3.7	5.6	1.3	3.2	0.3			0.5	0	7.2	0.6	7.9	0.6	3.8	0.3	1.4	5	6.7	5.3	4.4	4.3	0.7	3.7	6.1	5.6	0.2
				Nov-01				6.5		7.9	1.7						2.5	1.2	4.7	0.3			0.2	0	4.4	0.8		0.4	1.3	0	0.4						1.3				1
				Feb-02		6		6.2	5	5.2	2.3				1.6	3.4	1.2	5.6	1.9	1.7			0.8	0.6	7	1.2	7.1	1.2	3	0	0.5						1.4	2.8		4.9	0.9
				May-02				5.9		4.7	2.2						6.3	7.1	4.5	1.6			2.8	1.7	7.9	1.6		1.6	4.6	2.5	2.1						2.7				1.8
				Aug-02		5.7	6.7	7.2	3.5	3.3	2.3	6.3	1.5	2.6	2.3	3.7	4.8	5.5	3	1.9			2.1	2	8.1	1.6	8.2	1.5	4.3	1.5	0.8	4	4.6	4.4	4.3	4.5	1.1	4.7	6.3	5.8	1.6
				Nov-02				6.1		3.8	3.5						5.3	5.8	2.1	2.2			3.1	0.5	8.8	1.3		1	4	1	1						1.5				0.8
				Feb-03		4.8		3.6	5.5	1.5	1.4				0.4	5.2	2.7	4.4	2.7	1.3			1.5	0.6	7.2	0.2	8.1	0	3.5	0.6	0.2						1.5	3.8		4	0.5
				May-03				6.6		3.8	2.2						4.3	6.2	5.7	2.2			1.8	1.4	9.5	1.1		0.8	4.3	1	2						1.6				1.4
				Aug-03		6.8	5.5	5.5	2	3	1.2	7	1.2	2.7	0.8	6.5	5.3	5.1	2.6	1.2			1.3	0.2	10.1	0.3	8.1	0.4	4.1	0.5	0	3.7	3.8	4.8	3.6	4	0.7	3.8	5.4	5.3	1.2
				Nov-03				2.3		5.1	2.5						5	6	1.6	2			2.2	2.2	10.7	0.9		1.2	4.7	1.1	0.8						0.7				1.3
				Feb-04		8.2		3.4	1.1	3.8	2.3				0.2	0.6	5.4	5	4.7	7.2			1.2	0.6	12.2	1.5	5.2	0.6	4.3	0.4	1.5						6	4.6		5.3	0.9
				Aug-04		6.4	7.2	5.9	2.8	3.8	1.3	7.1	0.7	4.8	1.1	3.9	5.8	4.5	6.4	4.4			3.2	2	8.3	0.2	7.9	1.2	3.6	0.8	0.8	3.2	4.1	4.5	3	4	1.4	3.4	5.4	4.6	1.3
				Feb-05		7.4		4	3	3.5	1.2				2.4	5.9	5.3	6	3.7	6.3			1.7	1.5	10.4	0.6	7.1	1	4.5	1.4	1.5						2.2	3.8		5.1	1.1
				May-05[2]				1.5		3.8	1.8						5.4	6.3	3.3	4.9			2.6	0.4	9.7	1		0.6	3.8	1.1	1.2						1.5				1.2
				Aug-05		6.4	7.1	1.9	3	2	2.1	7.4	2.3	2.9	1.7	4.2	5	6.3	2.2	8.1	0.5	3.4	2.2	0.5	7.9	1.3	9.4	0.7	4.5	0.8	0.6	4.4	4.7	4.9	2.9	4.6	0.9	4.1	4.5	5.2	0.7
				Nov-05				2		4.4	1.8						5.1	5.2	1.8	6.1	0.5	4.6	2.2	0.4	8.9	0.8		5.2	3.8	1.3	1.7						2.1				1.5
				Feb-06		8.6		2.8	1.7	3.2	1.7				1.9	6.9	5.3	4.2	4.7	4.5	5.6	4.6	2.5	0	13.8	0.7	9.3	5.9	3.8	2.1	1.9						2.5	4		6	1.7
				Mar-06	3			7											6	5.5	1	4.5		1.5																	
Nitrate + nitrate - dissolved as N	mg/L	2	10	Nov-96			5.22	0.065	16.6	0.31	<0	6.9	0.6	<0	<0	0.79	<0	0.35					0.15	<0	2.57	<0	7.24	<0	7.27	<0	<0	8.71	4.61	4.68	2.15	6.02	<0	5.9	5.01	7.18	<0
				Aug-97			6.19	<0.04	17.4	<0.04	1.38	3.24	0.31	<0.04	<0.04	0.51	<0.04	<0.04					<0.04	<0.04	3.15	<0.04	8.39	<0.04	7.37	<0.04	<0.04	9.53	4.22	5.18	2.83	5.94	<0.04	6.27	4.65	7.54	<0.04
				Aug-98		3.22	6.83	0.15	10.9	0.16	1.28	5.48	0.74	0.04	0.14	1.49	0.1	0.52					0.12	0.09	3.68	0.12	8.65	0.09	9.17	<0.04	0.13	11	4.7	9.69	4.29	7.38	0.04	6.82	4.96	19.5	0.06
				Aug-99		1.6		<0.02	10		0.42	6	0.36	<0.02		1.1	<0.02	0.39					<0.02	<0.02	2.9	<0.02	8.8			<0.02	<0.02	10.5	4.8	5.8	3.8	7.2	<0.02		4.8	7	<0.02
				Aug-00		4.7		0.038	5.9	0.037	1.1	8.7	0.44	0.047	0.049	0.6	0.033	0.56					0.085	<0.02	3	0.024	9.2	0.075	8.8	0.029	0.023	11.1	4.5	5.6	2.8	7.2	0.033	4.8	5.6	9.8	0.043
				May-01				0.51		<0.02	0.68						<0.02	0.39	1.1	0.024			<0.02	<0.02	2.5	0.091		<0.02	4.7	0.059	<0.02						<0.02				<0.02
				Aug-01		3.6	9.5	0.4	4.5	<0.02	0.57	2.1	0.18	<0.02	<0.02	0.91	<0.02	<0.02	1.5	<0.02			<0.02	<0.02	3	<0.02	9.6	0.12	8.8	<0.02	11.1	<0.02	4	4	2.6	6.9	0.024	6.4	5.9	10.6	<0.02
				Nov-01				<0.02		0.031	0.044						<0.02	0.025	0.084	<0.02			<0.02	<0.02	0.14	<0.02		<0.02	0.7	<0.02	<0.02						<0.02				<0.02
				Feb-02		3.6		0.4	6.3	<0.02	1.5				<0.02	1.2	0.021	0.5	1.4	0.054			0.025	0.035	2.5	0.02	9.5	0.088	8.4	0.02	0.021						0.031	6		9.6	0.025
				Mar-02				0.33											1.5	0.022			0.11	<0.02																	
				May-02				0.037		<0.02	1.2						<0.02	0.42	0.5	0.022			0.04	0.03	0.056	<0.02		0.041	8.2	<0.02	<0.02						0.029				<0.02
				Aug-02		3.3	10.9	0.37	3.3	<0.049	0.54	3.8	<0.049	<0.049	<0.049	0.45	<0.049	0.6	1.6	0.085			<0.049	<0.049	2.7	<0.049	9.4	0.19	9.4	<0.049	<0.049	11.2	3.4	5.8	2.7	8.4	<0.049	7	6.4	9.8	<0.049
				Nov-02				0.26		<0.049	0.52						0.056	0.34	0.26	0.072			<0.049	0.12	0.075	<0.049		<0.049	0.68	<0.049	<0.049						<0.049				<0.049
				Feb-03		3.8		0.21	7.6	<0.049	0.49				<0.049	0.22	<0.049	0.59	0.54	<0.049			0.11	<0.049	2.5	<0.049	9.9	0.062	11.7	<0.049	<0.049						<0.049	7.2		12.1	<0.049
				May-03				0.24		0.17	0.1						<0.049	0.38	0.55	<0.049			0.11	<0.049	1.7	<0.049		0.097	8.5	<0.049	<0.049						<0.049				<0.049
				Aug-03		1.8	<0.049	0.22	0.097	0.11	0.33	4.1	<0.049		<0.049	<0.049	<0.049	<0.049	0.39	<0.049			<0.049	9.7	0.99	<0.049	<0.049	<0.049	3.9	<0.049	<0.049	11.5	3	2.8	1.3	3.5		2.4	2.4	11.6	<0.049
				Nov-03				0.055		0.38	0.16						<0.049	<0.049	0.3	0.16			<0.049	0.055	2.2	<0.049		0.072	9.3	<0.049	<0.049						0.054				<0.049
				Jan-04				0.23											0.54	0.2																					
				Feb-04		0.45		0.23	<0.049	0.38	0.49				<0.049	0.062	<0.049	<0.049	0.47	0.55			0.51	<0.049	1.4	<0.049	5.8	<0.049	8.4	<0.049	<0.049						<0.049	4.1		9.3	<0.049
				Mar-04															0.49																						
				Apr-04				0.48											0.73	0.14																					
				May-04				0.22											0.54	0.33																					
				Jul-04				0.26											0.27	0.35																					
				Aug-04		1.1	9.8	0.27	1.2	<0.049	2.7	9.5	0.11	<0.049	0.14	0.092	<0.049	0.53	0.09	<0.049			1	<0.049	3.1	0.049	9	0.12	9.2	<0.049	<0.049	11.6	3.6	5.7	2.6	8.8	0.071	7.7	7.4	10.6	<0.049

Attachment 4 – Summary of Groundwater Monitoring Schedule under the Low Flow Air Sparging Probationary Period

Summary of Groundwater and System Monitoring
Hagen Air Sparge System
Stoughton, Wisconsin

Existing Monitoring Plan	Startup Monitoring	Additional Groundwater Monitoring
IC04 (S)	OBS1A (W,B,M)	MW22 (Q,S)
MW22 (S)	OBS1B (W,B,M)	MW26 (Q,S)
MW23 (S)	OBS1C (W,B,M)	MW27 (Q,A)
MW26 (S)	EW1 (W,B,M)	OB11M (Q,A)
MW33 (S)	EW2 (W,B,M)	OB8M (Q,A)
MW7 (S)	MW22 (W,B,M)	OBS1A (Q,S)
P17B (S)		OBS1B (Q,S)
P17C (S)	OBS1C (W,B,M)	P17B (Q,S)
P17DR (S)	OBS2C (W,B,M))	P17C (Q,S)
P22B (S)	P17C (W,B,M)	P17DR (Q,S)
P22C (S)		P22B (Q,S)
P26B (S)		P26B (Q,S)
P33B (S)		P26C (Q,A)
P40D (S)		P27B (Q,S)
P7B (S)		P28B (Q,A)
MW1 (A)		P32B (Q,A)
MW27 (A)		P7B (Q,S)
MW29 (A)		
MW30 (A)		OBS1C (Q,S)
MW32 (A)		OBS2C (Q,S)
OB11M (A)		
OB8M (A)		
P26C (A)		
P27B (A)		
P28B (A)		
P28C (A)		
P29B (A)		
P29C (A)		
P30B (A)		
P30C (A)		
P32B (A)		
P35B (A)		
11 Private Wells (A)		

Notes:

1. S = part of regular semi-annual sampling program for VOCs and metals (arsenic, barium, iron, lead, manganese, and mercury), (all are also part of the regular annual sampling program).

2. A = part of regular annual sampling program for VOCs, PCBs, BNAs, metals, natural attenuation parameters (hardness, Ca, Mg, total dissolved solids, chloride, alkalinity, ammonia, total Kjeldahl nitrogen, COD, and nitrate/nitrite), cyanide, and pesticides. Parameters are different for private well samples.

3. W,B,M = wells will be tested bi-weekly for a period of four weeks after system startup, then monthly for an additional eight months for VOCs, dissolved oxygen, iron, nitrate, redox, manganese, sulfate, alkalinity, and pH.

4. Q,S = wells will be sampled quarterly for a period of two years for VOCs and natural attenuation parameters, then added to the regular semi-annual sampling program (see Note 1).

5. Q,A = wells will be sampled quarterly for a period of two years for VOCs and natural attenuation parameters, then added to the regular annual sampling program (see Note 2).

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Attachment 5 – Newspaper Notice Announcing Start of Five-Year Review

3/23/06 Stoughton Courier Hub

pare.

It's not just an excuse, but one of the primary reasons that the Vikings only etched out four points at the meet and while the guys

the year.

With the first benchmark set, the Vikings head to the Tri-State Invite at UW-Platteville on March 25 for a 4:30 p.m. start.

also hosts the Madtown Throwdown at the Alliant Energy Center.

It is easy to pinpoint where Dallas draws the fearless tenacity that he brings to the mat, but the technical aspect which he has refined has come from years of dedication to the sport.

"I don't really look at it as me living vicariously through him, the reason being that he is the one that brought the sign up sheet home, and he sucked," Pat said.

Dallas started wrestling in first grade, but he didn't win a first-place match until three years later. He wrestled a few tournaments in his first year with little success and considered quitting, however, while his father will never force him to commit to anything, he is a firm believer in finishing what you start.

"(Dallas) can walk away from it at anytime, I'm emotional no matter what it is that my kids do," Pat said. "I want them to be as good as they can be at (whatever they do). No opportunities lost and every opportunity that we're given

Dallas (above) and father Pat O'Malley(at right) have a special bond on and off the wrestling mat.

–Hub photos by Jeremy Jones

is an opportunity that we have to at least try. I don't care what it is.

"He can tell me tomorrow 'Dad I'm not wrestling anymore' and we'd walk away and go fishing, but if he were to tell me he wasn't going to school tomorrow, I'd kick his a–."

When Dallas was in seventh grade his family decided to move to Stoughton from Oregon for many reasons. Real estate was cheaper, life was easier, and one small variable was the obviously superior wrestling program.

"I remember, I won state in seventh grade and all the Stoughton guys were down there cheering me on," Dallas said. "Wrestling was bigger in Stoughton."

"When he came off the mat at least a dozen Stoughton guys were high-fiving him and back-slapping him," Pat said. "(Stoughton co-head coaches) (Bob) Kimpey and (Dan) Spilde stuck around to congratulate him and the Oregon coaches were nowhere to be found. (The coaches) didn't care about what colors he was wearing on the mat, they only cared about him as a human being."

"(The transition) was pretty smooth," Dallas said about becoming a Viking. "I knew a lot of kids from Stoughton through wrestling and I hung out with them."

So why does the O'Malley family bond extend beyond the mat?

"I don't feel obligated to take care of (Sean and Dallas), I enjoy taking care of them, I enjoy being a father, I enjoy being a husband and having just a cool family," Pat said. "It's this simple ... We're white trash man, that's all we are, that's all we'll ever be. The only thing I'll ever have in my life that means anything to me is my family, period. There's nothing on the face of this earth that means more to me than my kids and their success."

"I'd walk to the end of the earth with Dallas and I think that he'd do the same," Pat

collegiate aspirations other possibilities, thought of both wres the college level as becoming an ultimate

"It's cool to watch," said about fighting. "W (about the future)."

"It's entirely up where he decides to g wrestling," Pat said. " No. 1 fan and his No. Dallas has to grow le bounds if he wants to at the college level, both tally and physically."

"He's an all-around and he's dedicated t better and that mental is huge in fighting ... wrestling gives you th set to be effective at ... I don't know if I crazy about him doing we'll see," Pat said ab possibility of Dallas ing the mat with the o ring.

In the immediate f the father and son conti train together in prepa for the national wre tournament. Dallas pla bumping up to 215 nex and while he compet other sports he insists wrestling is demanding rewarding.

"Wrestling is intense," Dallas said. "I that makes the relation better. We've been th everything together (in tice)."

Pat and Dallas Stoughton with mothe and Dallas' brother Sea

As the two genera walk to the door and int night, it's obvious th O'Malley's are more simply the rowdy sectio the stands. While wres may be a large piece of lives at the moment it cl has its place as a greater of the whole.

ATTACHMENT 6

LIST OF DOCUMENTS USED FOR FIVE-YEAR REVIEW

1. Montgomery Watson Harza. "Air Sparging System Performance and Work Plan, Hagen Farm Site, Stoughton, WI", Prepared for Waste Management, Inc. January 2005.

2. Montgomery Watson Harza, "Hagen Farm Annual Operation and Maintenance Report Number 16 for the Source Control Operable Unit December 16, 2001 through November 30, 2002. Prepared for Waste Management, Inc. February 2003.

3. Montgomery Watson Harza, "Hagen Farm Annual Operation and Maintenance Report Number 1 for the Groundwater Control Operable Unit December 16, 2001 through November 30, 2002. Prepared for Waste Management, Inc. February 2003.

4. Montgomery Watson Harza, "Hagen Farm Annual Groundwater Monitoring Report Number 6, October 1, 2002 through November 5, 2002. Prepared for Waste Management, Inc. February 2003.

5. Montgomery Watson Harza, "Low Flow Air Sparge System Implementation and Monitoring Plan, Hagen Farm Site Groundwater Control Operable Unit". Prepared for Waste Management, Inc. January 2001.

6. RMT, Inc., "Technical Memorandum Re: Hagen Farm Interim Evaluation of Groundwater Monitoring Results." Prepared for Waste Management, Inc, October 14, 2005.

7. RMT, Inc., "Technical Memorandum Re: Hagen Farm Second Interim Evaluation of Groundwater Monitoring Results." Prepared for Waste Management, Inc, March 31, 2006.

8. RMT, Inc., "Annual Operation and Maintenance Report Number 19 for the Source Control Operable Unit December 1, 2004 through December 31, 2005, Hagen Farm, Town of Dunkirk, WI. Prepared for Waste Management, Inc. April 2006.

9. RMT, Inc., "Annual Operation and Maintenance Report Number 14 for the Groundwater Control Operable Unit December 1, 2004 through December 31, 2005, Hagen Farm, Town of Dunkirk, WI. Prepared for Waste Management, Inc. April 2006.

10. RMT, Inc., "Annual Groundwater Monitoring Program Report Number 9 November 6, 2004 through December 31, 2005, Hagen Farm, Town of Dunkirk, WI. Prepared for Waste Management, Inc. April 2006.

11. Subterranean Research, Inc., "Analysis of Plume Data, Hagen Farm Superfund Site". Prepared for U.S. EPA Region 5 under Volpe National Transportation Systems Center contract. May and July 2004.

12. U.S. Environmental Protection Agency, Fact Sheet: "Proposed Plan for Landfill Cleanup, Hagen Farm Superfund Site, Dunkirk, WI". July 1990.

13. U.S. Environmental Protection Agency, "Hagen Farm Site, WI. Source Control Operable Unit Declaration for the Record of Decision", September 17, 1990.

14. U.S. Environmental Protection Agency, "Explanation of Significant Differences for the Hagen Farm Superfund Site Groundwater Control Operable Unit, Dane County, WI". August 27, 1991.

15. U.S. Environmental Protection Agency, "Hagen Farm Site, WI. Groundwater Control Operable Unit Declaration for the Record of Decision", September 30, 1992.

16. U.S. Environmental Protection Agency, "Explanation of Significant Differences for the Hagen Farm Superfund Site Source Control Operable Unit, Dane County, WI". April 1996.

17. U.S. Environmental Protection Agency, "Superfund Preliminary Close Out Report, Hagen Farm Superfund Site, Dane County, Wisconsin". August 1996.

18. United States Environmental Protection Agency (U.S. EPA). June 2001. *Comprehensive Five-Year Review Guidance, Office of Solid Waste and Emergency Response. Directive 9355.7-03B-P.*

19. U.S. Environmental Protection Agency. September 2000. *Institutional Controls: A Site Managers Guide to Identifying, Evaluating and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups",* Office of Solid Waste and Emergency Response. OSWER Directive 9355.0-74FS-P. EPA 540-F-00-005.

20. U.S. Environmental Protection Agency, "Five-Year Review Report, Hagen Farm Superfund Site, Dane County, WI." September 21, 2001.

21. United States Environmental Protection Agency (U.S. EPA). 1996d. *Drinking Water Regulations and Health Advisories.* Office of Water. Washington, D.C.

22. Warzyn, Inc., "Groundwater Monitoring Plan, Groundwater Control Operable Unit, Hagen Farm, Town of Dunkirk, WI. Prepared for Waste Management of Wisconsin. July 1993.

23. U.S. Environmental Protection Agency, "Scope of Work for the Remedial Action Work Plan at the Hagen Farm Superfund Site, Stoughton, WI". Appended to Consent Decree. 2006

24. Volpe National Transportation Systems Center, U.S. Department of Transportation, "Hagen Farm Statistical Analysis Report, Sampling Period: February 1997 to February 2004". Prepared for U.S. EPA, Region 5. July 2004.

25. "U.S. EPA Region V, Unilateral Administrative Order, In the Matter of Hagen Farm Superfund Site, Dane County , Wisconsin Respondent, Waste Management of Wisconsin, Inc. V-W-92-C-172, November 1992.

26. U.S. EPA Region V, Administrative Order by Consent, In the Matter of Hagen Farm Site Respondents, Waste Management of Wisconsin, Inc. and Uniroyal Plastics Co., Inc. V-W-87-C-016, July 1987.

Attachment 7 – Five-Year Review Site Inspection Form (March 11, 2006)

Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION

Site name: Hagen Farm	**Date of inspection:** 5/11/06
Location and Region: Tn of Dunkirk, WI	**EPA ID:**
Agency, office, or company leading the five-year review: Gary A. Edelstein - WDNR	**Weather/temperature:** Light Rain 40°F

Remedy Includes: (Check all that apply)

- [X] Landfill cover/containment
- [X] Access controls
- [X] Institutional controls
- [X] Groundwater pump and treatment - inactive
- [ ] Surface water collection and treatment
- [X] Other Air Sparging; ISVE
- [ ] Monitored natural attenuation
- [ ] Groundwater containment
- [ ] Vertical barrier walls

Attachments: [ ] Inspection team roster attached [X] Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** John Roelke (Name) Env Tech, RMT (Title) 5/11/06 (Date)
   Interviewed [X] at site [ ] at office [ ] by phone Phone no. _____
   Problems, suggestions; [ ] Report attached _____

2. **O&M staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed [ ] at site [ ] at office [ ] by phone Phone no. _____
   Problems, suggestions; [ ] Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; G Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; G Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; G Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; G Report attached _____

4. **Other interviews** (optional) G Report attached.

Mike Peterson, RP Project Manager, WMI
Interviewed @ site

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - [X] O&M manual — Did n ISVE, Sparge — [X] Readily available — [X] Up to date — [ ] N/A
   - [X] As-built drawings — [X] Readily available — [X] Up to date — [ ] N/A
   - [X] Maintenance logs — [X] Readily available — [X] Up to date — [ ] N/A

   Remarks: Did not have manuals for SCOU, GAP, Fence
   Closed LF Env Insp log provided, attached (latest ones)

2. **Site-Specific Health and Safety Plan** — [X] Readily available — [X] Up to date — [ ] N/A
   - [X] Contingency plan/emergency response plan — [X] Readily available — [X] Up to date — [ ] N/A

   Remarks: Evacuation and response services outlined

3. **O&M and OSHA Training Records** — [X] Readily available — [X] Up to date — [ ] N/A

   Remarks: Certificates for OSHA cert readily available

4. **Permits and Service Agreements**
   - [ ] Air discharge permit — [ ] Readily available — [ ] Up to date — [X] N/A
   - [ ] Effluent discharge — [ ] Readily available — [ ] Up to date — [X] N/A
   - [ ] Waste disposal, POTW — [ ] Readily available — [ ] Up to date — [X] N/A
   - [ ] Other permits _____ — [ ] Readily available — [ ] Up to date — [X] N/A

   Remarks:

5. **Gas Generation Records** — [ ] Readily available — [ ] Up to date — [X] N/A

   Remarks:

6. **Settlement Monument Records** — [ ] Readily available — [ ] Up to date — [X] N/A

   Remarks:

7. **Groundwater Monitoring Records** — [ ] Readily available — [X] Up to date — [ ] N/A

   Remarks: Not kept @ site, sent to reg agencies electronically
   Kept @ Mike's office

8. **Leachate Extraction Records** — [ ] Readily available — [ ] Up to date — [X] N/A

   Remarks:

9. **Discharge Compliance Records**
   - [ ] Air — [ ] Readily available — [ ] Up to date — [X] N/A
   - [ ] Water (effluent) — [ ] Readily available — [ ] Up to date — [X] N/A

   Remarks: When GW extraction is operating a monthly monitoring report was submitted to WDNR.

10. **Daily Access/Security Logs** — [X] Readily available — [ ] Up to date — [ ] N/A

    Remarks: John keeps @ office - Keeps a record of visits

IV. O&M COSTS

1. **O&M Organization**
   G State in-house G Contractor for State
   G PRP in-house ☒ Contractor for PRP
   G Federal Facility in-house G Contractor for Federal Facility
   G Other RMT is the O&M Contractor
   Separate mowing and erosion repair contractor

Note: WMI does routine GWM

2. **O&M Cost Records**
   ☒ Readily available ☒ Up to date
   G Funding mechanism/agreement in place
   Original O&M cost estimate _____ G Breakdown attached

Kept @ Mike's office
Done Monthly and quarterly summaries prepared

Total annual cost by year for review period if available

From _____ To _____ _____ G Breakdown attached
Date Date Total cost

From _____ To _____ _____ G Breakdown attached
Date Date Total cost

From _____ To _____ _____ G Breakdown attached
Date Date Total cost

From _____ To _____ _____ G Breakdown attached
Date Date Total cost

From _____ To _____ _____ G Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**
   Describe costs and reasons: N/A

V. ACCESS AND INSTITUTIONAL CONTROLS G Applicable G N/A

A. Fencing

1. **Fencing damaged** ☒ Location shown on site map ☒ Gates secured G N/A
   Remarks Fence looked to be in Good Condition

B. Other Access Restrictions

1. **Signs and other security measures** ☒ Location shown on site map G N/A
   Remarks Warning signs at gate entry points and on North Side
   custom made signs

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented — G Yes ☒ No G N/A
Site conditions imply ICs not being fully enforced — ☒ Yes G No G N/A

Type of monitoring (*e.g.*, self-reporting, drive by) On site inspection
Frequency Semi Annual - copies of latest attached
Responsible party/agency WMI
Contact Mike Peterson PM
Name Title Date Phone no.

Reporting is up-to-date — ☒ Yes G No G N/A
Reports are verified by the lead agency — G Yes ☒ No G N/A
Not submitted to agencies
Specific requirements in deed or decision documents have been met — G Yes G No G N/A
Violations have been reported — G Yes ☒ No G N/A
Other problems or suggestions: G Report attached
Deed Restriction put in place 5/14/91 for on-site property
Rely on 1200' setback in WS code of off-property

2. **Adequacy** G ICs are adequate G ICs are inadequate G N/A
Remarks

D. General

1. **Vandalism/trespassing** G Location shown on site map ☒ No vandalism evident
Remarks

2. **Land use changes on site** G N/A
Remarks None noted but WMI is interested in a portion of west side of site, away from waste boundary as a container storage area

3. **Land use changes off site** G N/A
Remarks empty 10-30 yd³ loggers
Development to West is noted as starting to encroach towards site; most should be on city water - along

VI. GENERAL SITE CONDITIONS Race Track & Stone Crest

A. Roads ☒ Applicable G N/A

1. **Roads damaged** G Location shown on site map ☒ Roads adequate G N/A
Remarks

Roads still a fair distance away

B. Other Site Conditions

Remarks

VII. LANDFILL COVERS X Applicable G N/A

A. Landfill Surface

1. **Settlement** (Low spots) G Location shown on site map X **Settlement not evident**
   Areal extent_____ Depth_____
   Remarks_____

2. **Cracks** G Location shown on site map X **Cracking not evident**
   Lengths_____ Widths_____ Depths_____
   Remarks_____

3. **Erosion** G Location shown on site map X **Erosion not evident**
   Areal extent_____ Depth_____
   Remarks_____

4. **Holes** G Location shown on site map X **Holes not evident**
   Areal extent_____ Depth_____
   Remarks_____

5. **Vegetative Cover** X Grass X Cover properly established X No signs of stress
   G Trees/Shrubs (indicate size and locations on a diagram)
   Remarks a few shrubs outside work boundary along the rip rap - which is a weep detail

6. **Alternative Cover (armored rock, concrete, etc.)** X N/A
   Remarks_____

7. **Bulges** G Location shown on site map X **Bulges not evident**
   Areal extent_____ Height_____
   Remarks_____

8. **Wet Areas/Water Damage** ☒ Wet areas/water damage not evident
- G Wet areas — G Location shown on site map — Areal extent_____
- G Ponding — G Location shown on site map — Areal extent_____
- G Seeps — G Location shown on site map — Areal extent_____
- G Soft subgrade — G Location shown on site map — Areal extent_____

Remarks_____

9. **Slope Instability** G Slides G Location shown on site map ☒ No evidence of slope instability
Areal extent_____
Remarks_____

B. Benches G Applicable ☒ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** G Location shown on site map ☒ N/A or okay
Remarks_____

2. **Bench Breached** G Location shown on site map ☒ N/A or okay
Remarks_____

3. **Bench Overtopped** G Location shown on site map ☒ N/A or okay
Remarks_____

C. Letdown Channels G Applicable ☒ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** G Location shown on site map ☒ No evidence of settlement
Areal extent_____ Depth_____
Remarks_____

2. **Material Degradation** G Location shown on site map ☒ No evidence of degradation
Material type_____ Areal extent_____
Remarks_____

3. **Erosion** G Location shown on site map ☒ No evidence of erosion
Areal extent_____ Depth_____
Remarks_____

4. **Undercutting** G Location shown on site map X No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____

5. **Obstructions** Type_____ X No obstructions
G Location shown on site map Areal extent_____
Size_____
Remarks_____

6. **Excessive Vegetative Growth** Type_____
X No evidence of excessive growth
G Vegetation in channels does not obstruct flow
G Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations X Applicable G N/A

1. **Gas Vents** G Active G Passive
G Properly secured/locked X Functioning G Routinely sampled X Good condition
G Evidence of leakage at penetration G Needs Maintenance
G N/A
Remarks ISUC vents noted and in good condition

2. **Gas Monitoring Probes**
G Properly secured/locked G Functioning X Routinely sampled X Good condition
G Evidence of leakage at penetration G Needs Maintenance G N/A
Remarks_____

3. **Monitoring Wells** (within surface area of landfill)
X Properly secured/locked X Functioning X Routinely sampled X Good condition
G Evidence of leakage at penetration G Needs Maintenance G N/A
Remarks_____

4. **Leachate Extraction Wells**
G Properly secured/locked G Functioning G Routinely sampled G Good condition
G Evidence of leakage at penetration G Needs Maintenance X N/A
Remarks_____

5. **Settlement Monuments** G Located G Routinely surveyed X N/A
Remarks_____

E. Gas Collection and Treatment ☒ Applicable ☐ N/A ISVE

1. **Gas Treatment Facilities**
   ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
   ☒ Good condition ☐ Needs Maintenance
   Remarks Vented to atmosphere

2. **Gas Collection Wells, Manifolds and Piping**
   ☒ Good condition ☐ Needs Maintenance
   Remarks

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   ☒ Good condition ☐ Needs Maintenance ☐ N/A
   Remarks

F. Cover Drainage Layer ☐ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☒ Functioning ☐ N/A
   Remarks

2. **Outlet Rock Inspected** ☒ Functioning ☐ N/A
   Remarks

G. Detention/Sedimentation Ponds ☒ Applicable ☐ N/A

1. **Siltation** Areal extent____ Depth____ ☐ N/A
   ☒ Siltation not evident
   Remarks Sed pond noted on SE portion of site

2. **Erosion** Areal extent____ Depth____
   ☒ Erosion not evident
   Remarks

3. **Outlet Works** ☒ Functioning ☐ N/A
   Remarks

4. **Dam** ☐ Functioning ☒ N/A
   Remarks

H. Retaining Walls G Applicable X N/A

1. **Deformations** G Location shown on site map G Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks_____

2. **Degradation** G Location shown on site map G Degradation not evident
   Remarks_____

I. Perimeter Ditches/Off-Site Discharge X Applicable G N/A

1. **Siltation** G Location shown on site map X Siltation not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Vegetative Growth** G Location shown on site map G N/A
   X Vegetation does not impede flow
   Areal extent_____ Type_____
   Remarks_____

3. **Erosion** G Location shown on site map X Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4. **Discharge Structure** X Functioning G N/A
   Remarks_____

VIII. VERTICAL BARRIER WALLS G Applicable X N/A

1. **Settlement** G Location shown on site map G Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Performance Monitoring** Type of monitoring_____
   G Performance not monitored
   Frequency_____ G Evidence of breaching
   Head differential_____
   Remarks_____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☒ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
   ☒ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A
   Remarks Not in operation at this time

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☒ Good condition ☐ Needs Maintenance
   Remarks

3. **Spare Parts and Equipment**
   ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
   Remarks Not in operation; can be obtained if necessary it started up again

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps, and Electrical**
   ☐ Good condition ☐ Needs Maintenance
   Remarks

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☐ Good condition ☐ Needs Maintenance
   Remarks

3. **Spare Parts and Equipment**
   ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
   Remarks

A.1. Air sparging system in good condition, blowers in good shape
spare parts for blowers kept on site

C. Treatment System ☒ Applicable ☐ N/A Note: Currently inactive

1. **Treatment Train** (Check components that apply)
   - ☐ Metals removal
   - ☐ Oil/water separation
   - ☒ Bioremediation
   - ☐ Air stripping
   - ☐ Carbon adsorbers
   - ☒ Sedimentation
   - ☐ Filters _____
   - ☐ Additive (e.g., chelation agent, flocculent) _____
   - ☐ Others _____
   - ☒ Good condition
   - ☐ Needs Maintenance
   - ☐ Sampling ports properly marked and functional
   - ☐ Sampling/maintenance log displayed and up to date
   - ☒ Equipment properly identified
   - ☐ Quantity of groundwater treated annually _____
   - ☐ Quantity of surface water treated annually _____
   - Remarks Not currently operating

2. **Electrical Enclosures and Panels** (properly rated and functional)
   - ☐ N/A
   - ☒ Good condition
   - ☐ Needs Maintenance
   - Remarks _____

3. **Tanks, Vaults, Storage Vessels**
   - ☐ N/A
   - ☒ Good condition
   - ☐ Proper secondary containment
   - ☐ Needs Maintenance
   - Remarks _____

4. **Discharge Structure and Appurtenances**
   - ☐ N/A
   - ☒ Good condition
   - ☐ Needs Maintenance
   - Remarks Seepage cell

5. **Treatment Building(s)**
   - ☐ N/A
   - ☒ Good condition (esp. roof and doorways)
   - ☐ Needs repair
   - ☐ Chemicals and equipment properly stored
   - Remarks _____

6. **Monitoring Wells** (pump and treatment remedy)
   - ☒ Properly secured/locked
   - ☐ Functioning
   - ☐ Routinely sampled
   - ☒ Good condition
   - ☐ All required wells located
   - ☐ Needs Maintenance
   - ☐ N/A
   - Remarks _____

D. Monitoring Data

1. **Monitoring Data**
   - ☒ Is routinely submitted on time
   - ☒ Is of acceptable quality

2. Monitoring data suggests: See Report
   - ☐ Groundwater plume is effectively contained
   - ☐ Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
G Properly secured/lockedG Functioning G Routinely sampled G Good condition
G All required wells located G Needs Maintenance ☒ N/A
Remarks_____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

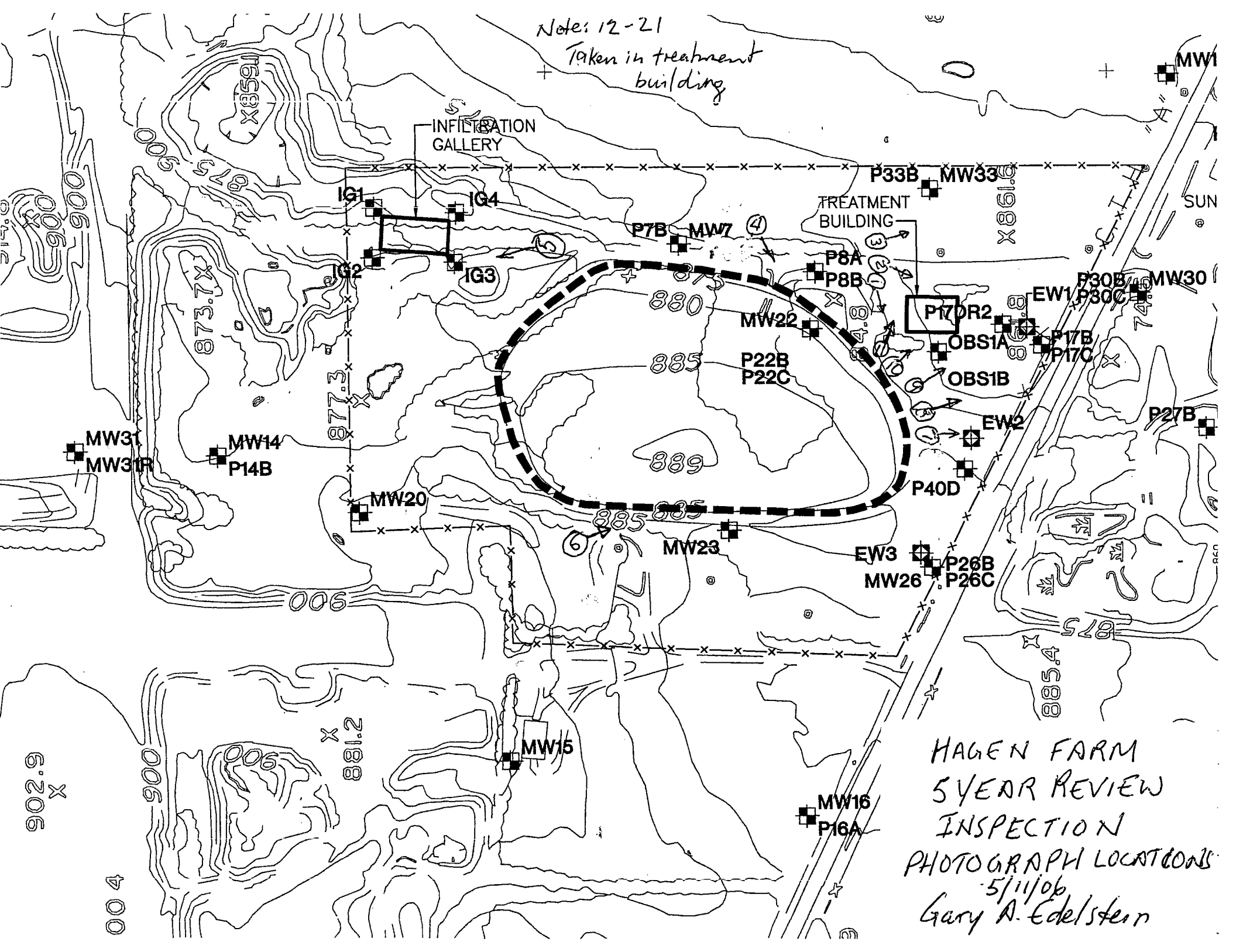
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Attachment 8 – Photography Log from May 11, 2006 Five-Year Review Site Inspection

Hagen Farm
Five Year Review Inspection
Photograph Descriptions
5/11/06
Gary A. Edelstein

See map for locations where photos were taken and direction they were taken in

1. ISVE 'hut' on right, treatment building on left
2. Access road and treatment building, Mike Peterson – WMI Project Manager
3. Sedimentation basin
4. LF cap showing monitoring points and white ISVE points
5. Infiltration gallery
6. Looking over cap towards treatment building
7. Groundwater extraction well 2 looking towards CTH A
8. Groundwater extraction well 1 looking towards CTH A
9. Groundwater extraction well 1 and air sparging point looking towards CTH A
10. Air sparging point near treatment building
11. Treatment building on right, ISVE 'hut' on left
12. Air sparging compressors in treatment building
13. Blowers for inactive groundwater treatment system
14. Clarifier for inactive groundwater treatment system
15. Treatment tanks for inactive groundwater treatment system
16. Air sparging compressors in treatment building
17. Blowers for inactive groundwater treatment system
18. Treatment tanks for inactive groundwater treatment system
19. Treatment tanks for inactive groundwater treatment system
20. Entry gate sign


Note: 12-21
Taken in treatment building
INFILTRATION GALLERY
IG1
IG4
IG2
IG3
P7B
MW7
TREATMENT BUILDING
P33B
MW33
P8A
P8B
MW22
P22B
P22C
P17OR2
OBS1A
OBS1B
P17B
P17C
EW1
P30B
P30C
MW30
EW2
P27B
P40D
MW31
MW31R
MW14
P14B
MW20
MW23
EW3
P26B
P26C
MW26
MW15
MW16
P16A
HAGEN FARM
5 YEAR REVIEW
INSPECTION
PHOTOGRAPH LOCATIONS
5/11/06
Gary A. Edelstein

(1)

(2)

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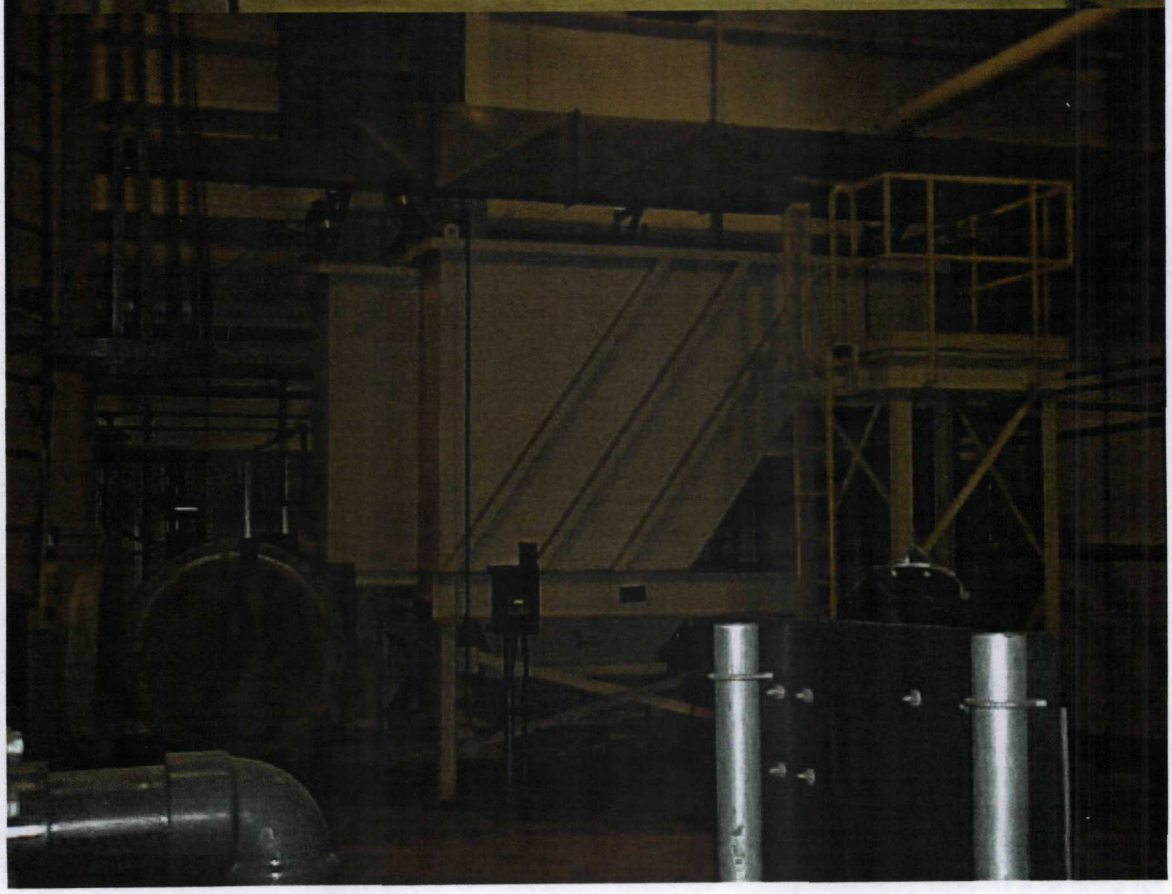

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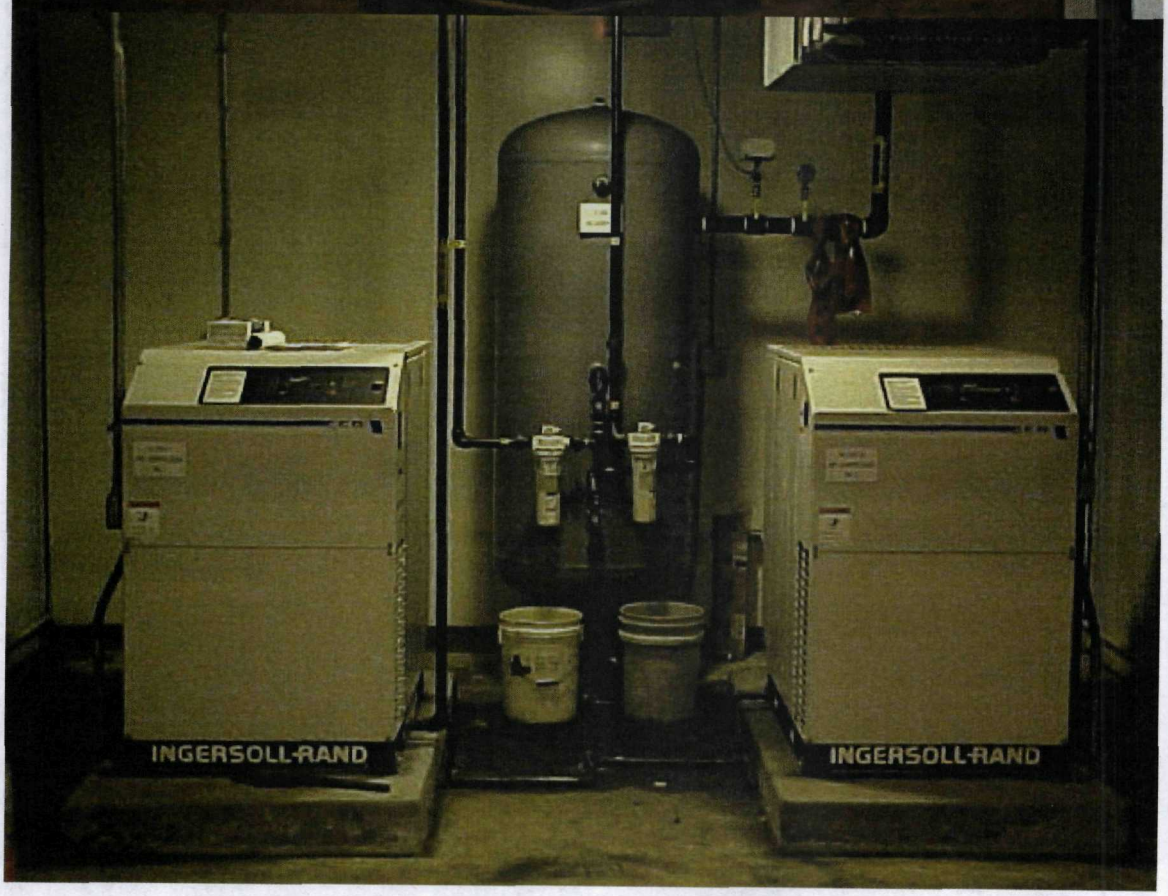

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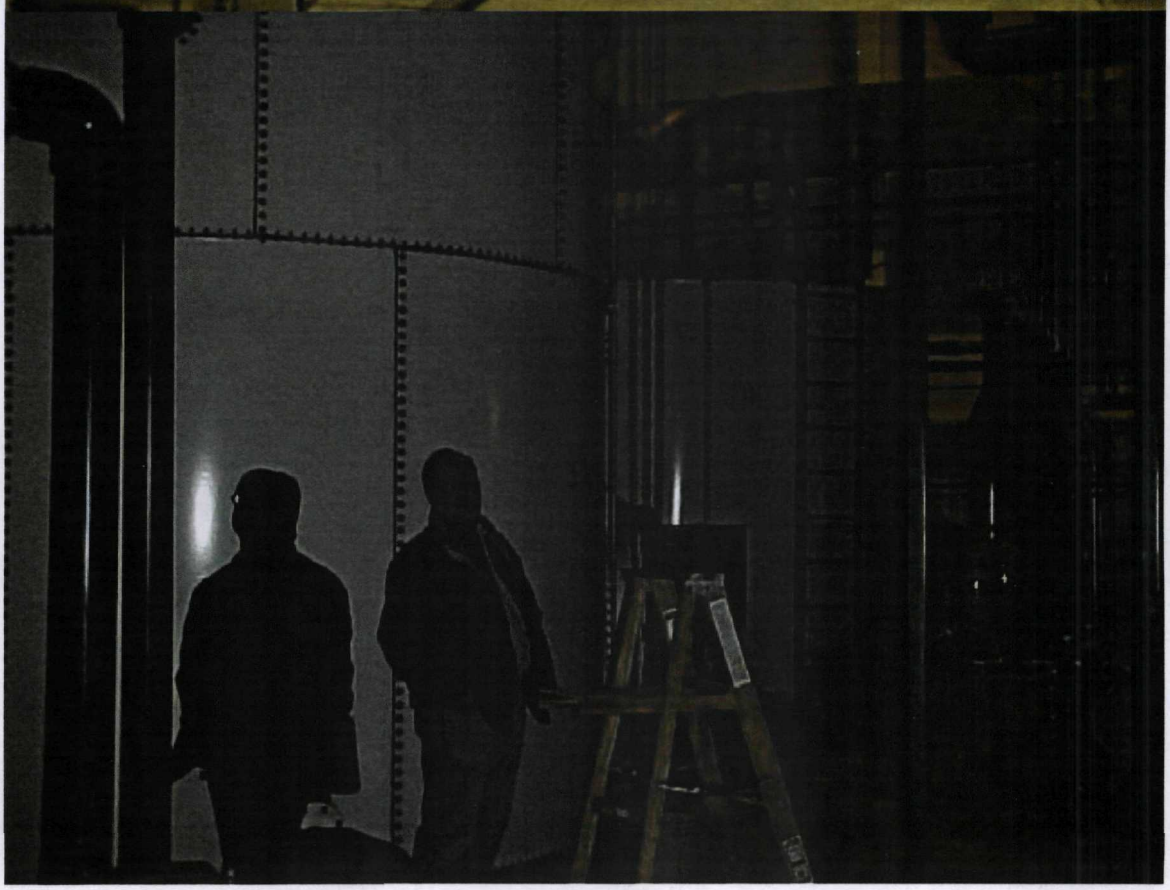

(18)

(19)


AMERICAN
FENCE
WARNING
AUTHORIZED PERSONNEL ONLY
THIS AREA CONTAINS HAZARDOUS CHEMICALS

(20)

Appendix

Institutional Controls Study for the Hagen Farm Site

Appendix

Institutional Controls Study for the Hagen Farm Site